

**Easy Cloning With Jorge**

# HIGH TIMES

September 4/6

## **ELECTRIC SUNSHINE**

Ultimate Lighting Guide

**2015  
Gear of  
the Year!**

See p.63

**AFGHANISTAN:  
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0 9 >

# BC Bud Depot

## AND REEFERMAN REEFERMAN SEEDS

NOVEMBER 2004



CELEBRATE  
**10 YEARS**  
OF CHAMPIONSHIP BREEDING!



DECEMBER 2014

**10 YEARS YOUNGER:** Reeferman (Charles Scott, left) and BCBD's Matt Harvey each placed first overall at the High Times Cannabis Cup in 2004, in Amsterdam. Charles took home the Sativa crown with Love Potion #1 and Matt's winning Indica was BC God Bud.



In 2014 Charles (2nd from right) and Matt (center) were back in Amsterdam at the 27th Annual Cannabis Cup. BC Bud Depot won an award with Night Nurse, a joint project and hybrid of Reeferman's Harmony.

CHECK OUT THE TRAILER  
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WEARIE.COM

### REEFERMAN'S SEED LIST

#### PRICES PER 10-SEED PACK

- BC GOLD - \$100
- BIG SUR HOLY WEED - \$100
- BOHDI SATVA - \$100
- CBD OG KUSH - \$125
- CBD WILLIE - \$125
- CHINA WHITE - \$100
- EARLY BUBBA KUSH - \$100
- EARLY PURPLE KUSH - \$100
- FIRE OG KUSH - \$200 ♀
- GOLDEN TEMPLE KUSH - \$100
- GRAPEFRUIT - \$200 ♀
- HARMONY - \$100
- HASH PLANT - \$100
- HOA BAC SILVER FLOWER - \$200 ♀
- KINGS CROSS - \$100
- KODIAC GOLD - \$100
- LOVE POTION X NIGERIAN - \$100
- LOVE POTION 1.1 - \$100
- MALAWI WOWIE - \$200 ♀
- NIGERIAN NIGHTMARE - \$100
- ORANGE PEAKO - \$100
- PETROLIA HEADSTASH - \$100
- PINK KUSH - \$100
- PURPLE CONGO KUSH - \$200 ♀
- SOUR DIESEL - \$100
- WAKEFORD 1.0 - \$200 ♀
- WILLIE NELSON - \$100



REEFERMAN AND BC BUD DEPOT ARE OPENING A DISPENSARY!

MY NAME IS CHARLES SCOTT. I PERSONALLY GUARANTEE THE EXCELLENCE OF THE STRAINS I BREED.

AUTHENTIC REEFERMAN SEEDS CAN NOW ALSO BE FOUND AT SEEDSMAN.COM.

FOR ALL OF YOUR REEFERMAN AND BCBD FLOWERS AND SEEDS, COME AND SEE US AT REVOLUTION MEDICAL CLINIC, 1012 SOUTHWEST MARINE DRIVE, IN VANCOUVER, BC.



REEFERMAN SEEDS AVAILABLE ONLY AT:  
**WWW.REEFERMANSEEDS.COM**  
AND OUR TRUSTED VENDORS: BC BUD DEPOT & THE ATTITUDE SEED BANK

**WARNING! THE FOLLOWING WEBSITES ARE 100% FRAUDULENT:**  
MEDICINALMSS.COM, OLDSCHOOLBA.COM, REEFERMANGENETICS.COM

**1-888-40-BCBUD  
(1-888-40-22283)**



**ANOTHER WIN!**  
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**NIGHT NURSE**  
BC HASHPLANT X REEFERMAN HARMONY  
X FIRE OG KUSH MALE

WHOLESALE INQUIRIES:  
EMAIL:  
WHOLESALE@BCBUDEPOT.COM

UK WHOLESALE INQUIRIES:  
BASIL BUSH LIMITED  
JUSTIN@BASILBUSH.CO.UK

BC BUD DEPOT SEEDS  
AVAILABLE HERE:

- \* REVOLUTION DISPENSARY VANCOUVER, BC
- \* ATTITUDE SEED BANK - UK
- \* JACKSON COMPASSION CLUB, JACKSON, MICHIGAN
- \* THE HONEY SPOT - LOS ANGELES, CALIFORNIA
- \* GTA SEEDBANK - TORONTO, ONTARIO
- \* THE LEMONADE STAND - KAMLOOPS, BC
- AND **MANY** MORE LOCATIONS!

**SEED LIST**

INDOOR / OUTDOOR

- BC GOD BUD - \$90 (())(())
- THE PURPS - \$90 (())(())
- GIRL SCOUT COOKIES Bx1 - \$90 (())(())
- SWEET GOD - \$75 (())(())
- CHEM FIRE - \$75 (())(())
- THE BLACK - \$75 (())(())
- BC MANGO - \$75 (())(())
- BC BLUEBERRY - \$75 (())(())
- THE BIG - \$75 (())(())
- SHIATSU KUSH - \$75 (())(())
- SWEET ISLAND SKUNK - \$75 (())(())
- TEXADA TIMEWARP - \$75 (())(())
- ANIMAL COOKIES - \$90
- BC SWEET TOOTH - \$75
- BC CHEESE - \$75
- NIGHT NURSE - \$90 (NEW WINNER!)
- 707 HEADBAND - \$75
- BC HASH PLANT - \$75
- BC NORTHERN LIGHTS - \$75
- ULTIMATE PURPLE - \$75
- BC KUSH - \$60
- PURPLE BUDDHA - \$60
- SOCAL MASTER KUSH - \$75
- WHITE WIDOW - \$75
- AMNESIA HAZE - \$75
- FIRE OG Bx3 - \$75
- ALBINO RHINO - \$60
- BC BIG BUD - \$60
- BC PINEWARP - \$75
- INDOOR MIX - \$75
- OUTDOOR MIX - \$50

(PRICES PER 12-SEED PACK)

HIGH CBD

- CBD GOD - \$90 (())
- HARLEQUIN Bx4 - \$90

FEMINIZED

- BC GOD BUD - \$150 (())(())(())(())(())(())
- THE PURPS - \$150 (())(())(())(())(())(())
- GIRL SCOUT COOKIES - \$150 (())(())(())(())(())(())
- ORIGINAL BLUEBERRY - \$150 (())(())(())(())(())(())
- STRAWBERRY COUGH - \$125 (())(())(())(())(())(())
- JACK HERER - \$125 (())(())(())(())(())(())
- SKUNK #1 X NL - \$125 (())(())(())(())(())(())
- SWEET DREAMS - \$125 (())(())(())(())(())(())
- CINDERELLA 99 - \$125 (())(())(())(())(())(())
- BC HASH PLANT - \$125 (())(())(())(())(())(())
- BC CHEESE - \$125 (())(())(())(())(())(())
- BC PINEWARP - \$125 (())(())(())(())(())(())
- WHITE WIDOW - \$125 (())(())(())(())(())(())
- SOCAL MASTER KUSH - \$125 (())(())(())(())(())(())

AUTO FLOWERING

- LOWRYDER #2 - \$125 (())

(()) = AWARD (()) = 100% FEMALE

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CANADA V9B 6J9



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EXPANDERS  
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**Piranha**—Expand the surface area of your plant roots by up to 75%. Help your crops obtain as much as 86% more nitrogen, 234% more phosphorus, and 75% more potassium. This means heightened grow, greater leaf area, more bud production, better bloom structure, and increased weight. Piranha Liquid also seeks and destroys harmful pathogens and molds, while strengthening crop resistance to stress.

**Tarantula**—Its beneficial bacteria inoculate the roots, safeguarding them by competing with and warding off harmful bacteria that can infect your plants. Reduces tissue damage from heavy fertilizer salts. Increases plant growth and yields by releasing grow and bloom cofactors and aiding chlorophyll, so your high-intensity lighting is more effective.

**Microbial Munch**—Maximize your microbes! Support, strengthen and maximize the benefits from all the beneficial microbes and fungi. It's a "superfood"—exactly what your plants need to transform into bigger, stronger, more resilient, and more beneficial creatures. In short, it's like putting them on steroids.

BUD AID  
TRIBE



## "INSURANCE" FOR YOUR GROW ROOM

**Sensi Cal-Mag Xtra**—If you're using base nutrients made by other companies, your crops could be deficient, leading to stunted growth and yellowing leaves. You can prevent that with Sensi Cal-Mag Xtra, the only calcium and magnesium supplement formulated with the exact Ca, Mg, and Fe ratios unique to the high-value plants we grow.

**Revive**—Guaranteed to rejuvenate your crops if they get into nutrient-deficiency trouble—which can happen if something unexpected and beyond your control occurs...or you're using inferior nutrients. Save plants in distress by adding it to your nutrient solution or using it as a foliar spray at the first sign of trouble. These rejuvenating substances flood the plant with healing nutrition. Use it at the first sign of trouble and your precious plants will get their best chance not only to survive, but thrive!

BUD POTENCY  
& STALK  
STRENGTHENERS  
TRIBE



## GROW MORE GLISTENING, STICKY, RESIN-GLAZED, TRICHOME-COVERED BUDS AND STURDIER, STRONGER STALKS AND BRANCHES!

**Nirvana**—Guarantees bigger yields and bigger, denser, heavier buds... while driving your plants at a faster metabolic rate. Experience increased yield, quality, aroma, color, essential oils, and resin production faster than you could have imagined without using synthetic nutrients.

**Rhino Skin**—Increases trichomes and essential oils for more potent harvests. Your crops will stand up straighter and support bulkier, heavier buds. You'll get big, sticky, potent harvests with greater market value.

**Bud Factor X**—Triggers systemic acquired resistance (SAR) within plants to produce markedly higher amounts of essential oils and terpenoids which directly benefit taste, aroma, and resin production, giving you higher-quality crops with greater market value.

**B-52**—Amplifies overall plant metabolism, promotes strong root development, boosts growth and helps your crops fight off stresses such as intense light, cold weather, ozone, drought, and salinity.

CROP  
SUBSTRATE  
SUPERCHARGERS  
TRIBE



## THE MOST OVERLOOKED AREA FOR GETTING POUNDS OF BUDS

**Sensizym**—Specifically formulated enzymes that scour the root zone, removing debris and eradicating disease by "recycling" it into usable carbohydrates that fuel bud growth and boost yields. Growers report it also decomposes root zone debris so well, you can often reuse growing media such as rockwool and coco coir for another crop lifecycle—saving you money!

**Ancient Earth Organic**—A rich combination of humic and fulvic acid that will help transform your growing medium into a richer, healthier, more vibrant foundation for your crops while pumping up their roots. Also stabilize the pH and optimize nutrient delivery. Helps plants withstand disease, drought, and other environmental stresses.



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ENHANCERS  
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YOU'VE ALWAYS  
IMAGINED.  
AND WHEN USED  
TOGETHER, WILL  
GREATLY ENHANCE EACH  
OTHER'S EFFECTIVENESS.



BIGGER BUDS  
TRIBE

## OPTIMIZES YOUR 3 CRITICAL PHASES OF BUD DEVELOPMENT!

### Bud Initiation Phase

**Bud Ignitor**—All the energy your high-value crops had been putting into grow will transfer into a massive burst of blooms. You'll start to see signs of prolific budding within 5 days, instead of 10 or more without it.

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**Big Bud**—In the same way bodybuilders take in amino acids after a workout to bulk up on proteins—the building blocks of life—so too do your buds need a big amino boost. See gains in size, mass, and potency from the rich assortment of bioavailable amino acids.

### Ripening Phase

**Overdrive**—Get even more out of your plants during the finishing phase. Reinvigorate your crops with a second wind, giving you much bigger yields when harvest day dawns.

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BUD TASTE  
& TERPENE  
ENHANCERS  
TRIBE



## THE "SECRET" TO MAXIMIZING TASTE, INTENSIFYING FLAVOR, AND AMPLIFYING THE AROMA OF YOUR CROPS

**Bud Candy**—The simple and complex carbohydrates in Bud Candy give them an instantly accessible source of energy for more floral growth. Includes bloom-enhancing plant extracts that increase essential oils for higher potency, better aroma, richer flavor and deeper, more pleasing colors.

**Flawless Finish**—Removes excess chemical residues from your growing medium, roots and other plant tissues, including fruits and flowers. You'll have the cleanest, sweetest yields possible. Use Flawless Finish right before your next harvest and taste the results for yourself.

# HIGH TIMES SEPTEMBER



*"We deployed a highly sensitive and specially calibrated spectro-radiometer to measure each bulb's light quality and to produce a spectral curve showing the range of spectrum emitted by each lamp."*

—Electric Sunshine, page 45

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| <p><b>8 Internet</b><br/> <b>10 Editor's Letter</b><br/> <b>12 Letters</b><br/> <b>14 Contact High</b><br/> <b>23 Highwitness News</b><br/>         Florida Discriminates,<br/>         High Five and the<br/>         Global Drug War<br/> <b>33 Entertainment</b><br/>         Chris Santa Maria,<br/>         Ty Dolla \$ign &amp; Reviews<br/> <i>Food (p.40)</i><br/> <i>Markets (p.42)</i><br/> <b>116 Cannabusiness</b><br/> <b>119 Dear Danko</b><br/> <b>126 Miss High Times</b><br/> <b>130 The Dab Department</b><br/> <b>132 Almost Infamous</b><br/> <b>134 NORMLizer/FFOTM</b><br/> <b>136 Furry Freak Brothers</b><br/> <b>144 Next of the Crop</b><br/> <b>148 Next Month</b><br/> <b>154 The Pot 40</b></p> | <p><b>45 Electric Sunshine</b><br/>         These days we have LEDs as well as plasma, ceramic and induction lamps. But how do you determine which ones are best for your bud? Here's the definitive grower's guide to the latest lighting technologies. <i>By Nico Escondido</i></p> <p><b>63 2015 S.T.A.S.H. Awards</b><br/>         The High Times Cultivation Department reveals our annual list of outstanding pot-production products. From growboxes and lighting to nutrients and concentrate-extraction equipment, check out our expert picks for the best grow gear of the year.</p> <p><b>72 The Green Zone</b><br/>         A veteran of the Afghan war relives the terror and tedium that characterized his tour of duty—and reveals how smoking the local cannabis and hash helped ease the stress of combat for his band of brothers. <i>By Jack Porter</i></p> | <p><b>89 Seeds of Desire</b><br/>         Led by the master breeder known as Swerve, the Cali Connection started off as one of the first seed companies in the United States. Get an inside look at a true superstar of the American cannabis scene. <i>By Dan Skye</i></p> <p><b>99 Cloning by Jorge Cervantes</b><br/>         Healthy clones are the key to successful harvests. In this excerpt from his comprehensive new <i>Cannabis Encyclopedia</i>, grow guru Jorge Cervantes brings to light all of his tips and tricks for properly rooting cuttings.</p> <p><b>109 The High Times Interview: George Jung</b><br/>         George Jung—immortalized by Johnny Depp in the movie <i>Blow</i>—is perhaps the most famous drug smuggler America has ever produced. We caught up with him after he was released from federal prison, after serving nearly 20 years for smuggling pot. <i>By Chris Simunek</i></p> |
|--|--|--|

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## Under Your Skin!

In an ancient Samoan song, a traditional tattoo artist calls his work “an everlasting gem that you will take into your grave.”

Members of Polynesian societies have been “inking” themselves for over 2,000 years, but Christian religious beliefs have always discouraged the practice. But over the past 30 years, in North America and beyond, the derma has become everyone’s personal canvas, an opportunity to become a walking work of art, as well as a colorful forum for expressing one’s passions.

Needless to say, we see hundreds of tattoos that express devotion to cannabis. Readers love showing us their ink.

How about you? We want to see what’s under your skin. Beginning this month, our website will begin posting regularly occurring galleries of the best pot tattoos on the planet. Send us photos of your personal homage to weed. If you’ve got a great ganja tattoo, we want to see it. Then we’ll show it to the world!

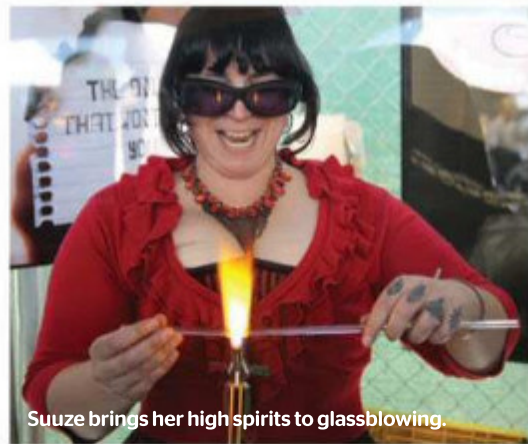
Send your pot tattoo photos to [tattoos@hightimes.com](mailto:tattoos@hightimes.com)



Jon Gettman

### Gettman on Ganja

Jon Gettman holds a Ph.D. in public policy and teaches undergraduate criminal justice and graduate level management courses. He’s a long-time contributor to *High Times* and his research has been used by NORML, Americans for Safe Access, the Drug Policy Foundation, the ACLU and other organizations. His contributions to the topic of marijuana law reform have included findings on the economic value of domestic marijuana cultivation, marijuana’s rescheduling under federal law and racial disparities in marijuana possession arrest rates. Check out Jon’s column twice a week at [hightimes.com](http://hightimes.com).



Suuzze brings her high spirits to glassblowing.

### Glass Artist of the Month

Glassblowing isn’t just a passion for me, it’s my life!” exclaims Oakland-based artist Suzanne Tipton, aka Cool-Hand Suuzze. (Instagram: [coolhandsuuzze](https://www.instagram.com/coolhandsuuzze))

She isn’t kidding! She’s been in the game since 1997! She got her start in Eugene, OR. She’s worked behind the torch for a number of outfits including Jerome Baker Designs, Tree-top Glass and Mountain Jam Glass, Andrews Glass (scientific), Chemglass (scientific) and Revere Glass.

In 2006, she graduated with a degree in scientific glass blowing and spent seven years working in the scientific glassblowing industry where she discovered

her passion for working the glass lathe. When she decided to return to pipemaking in 2012, those skills naturally followed her.

Madam Cool-Hand now works out of Acala Glass Studio in Oakland and is focusing on expanding her body of work as an artist. “For years I considered myself a skilled craftsman,” she says. “I made functional items that were beautiful in form. It wasn’t until the last 2 years that I’ve begun to see myself as an artist and been able to explore glass as a medium for expressing myself creatively. Everything I’ve learned in these 18 years has brought me to this apex. Now I’m really just exploding with ideas!”

Check out [Suuzze’s work online](#).



Russ Belville

### Radical Rant

Thousands of savvy cannabis activists listen to “The Russ Belville Show” on the Internet. And you can catch his writings on a regular basis in our pages. Russ always has a unique, hard-charging perspective on the world of cannabis. But did you know he also pens “Radical Rant” twice weekly at [hightimes.com](http://hightimes.com)? Check Russ out. A little righteous anger goes a long way!

#### POT POLL

### Who’s Your Choice for Prez??

Yeah, we know. The Presidential election is over a year away. But that’s never stopped anyone from asking who’s your fave? Of nearly 2,400 respondents, over one-third of you prefer Sen. Bernie Sanders, with Sen. Rand Paul lagging behind with only 23 percent. Hilary garnered only 16 percent. So they’re off and running!\* Expect a very mucky track...

Cast your vote in our latest poll online!



\*Receiving 1 percent or less: Jeb Bush, Gov. Chris Christie, Mike Huckabee, Gov. Bobby Jindal, Gov. Rick Perry, Sen. Marco Rubio, Jim Webb





• A M E R I C A ' S *High* T E A •

W W W • C A N N A T E A • O R G



Freebie: an artist passes on.

## Lighting the Future

**I** am always honored whenever I get to write the Editor's Letter that kicks off each issue. If you know me, you know that I'm overly passionate about this magazine. I believe in our cause and I believe that *High Times* has been a significant catalyst for change over our 41-year history.

Of course, those years take their toll. Our entire staff here reflects on the contributions of the man we all came to know and love as "Freebie," who has now moved on to a better world—one where we know his beloved plant is free to all.

Freebie, known as Jeff to friends and family, was one of *High Times'* best photographers, illuminating our imaginations with the glorious bud shots that have graced our covers, centerfolds and features for nearly two decades. He was also a founder of the Method Seven company and a strong supporter of our right to use and disseminate the plant as needed. Jeff left us much too soon, and he will be sorely missed by all.

This issue centers on our annual "Gear of the Year" feature, in which we profile the finest products on the market for our cultivation and consumer needs.

But perhaps my favorite gear is that which brings with it the real feel of Tomorrowland! I'm talking about the new technology that is thriving in the indoor horticultural lighting industry. The artificial sunlight that allows us to grow prime-time flowers indoors, all year round, is one of our most underappreciated allies in the movement to overgrow prohibitionist governments! So it's with great pleasure that I unveil a feature, nearly six months in the making: our guide to the future of indoor growing and lighting, aptly titled "Electric Sunshine."

We also welcome "The Fabulous Furry Freak Brothers" back to our pages. This vintage, hilariously creepy trio push the stoner envelope once again!

Stay happy and high, amigos!

*Nico Escondido*  
Editor-at-Large

# HIGH TIMES

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Grow Consulting Team:



### Take Out the Vote

The one thing that unites most people in the US today is cannabis legalization. It's the one thing we all can agree on. As Peter Tosh sang, "Doctors smoke it, nurses smoke it, / Judges smoke it, even the lawyer too." Straight people smoke it; gay people smoke it; more people of all races smoke it—and smoke it openly—than ever before. Let's get pot legalized and the wars ended, then we'll go from there. I'm voting for Rand Paul.

*Toker Voter*

### God Still Loves You!

I've just been informed that I've been kicked out of my church for smoking the devil's lettuce, the weed with roots in hell! Oh, Lord, I am a sinner! Never mind that it's the only medicine that eases my bipolar depression. Also, I've never killed anyone, never beaten or cheated on my wife, and my daughter is an honor student.

But apparently, smoking pot is the ultimate sin—every bit as bad as being gay! All I can say is good riddance to bad rubbish. I think it's time I found a church where Jesus, not Harry Anslinger or J. Edgar Hoover, is in charge.

*Tom  
Tennessee*

### Be the Difference!

Marijuana is still classified as a Schedule I drug, along with drugs like heroin and LSD. I'm not for or against the use of any of the drugs listed; I'd simply like to make one educated recommendation based on the facts. According to the Controlled Substances Act, Schedule I drugs, substances, or chemicals are defined as drugs with "no currently accepted medical use" with "a high potential for abuse." Schedule I drugs are the most dangerous drugs of all the drug schedules with no "accepted safety for use."

Legalization will certainly cause controversy, along with a possible backlash. But the times are changing. Educate yourself, and when the time comes to make a difference, go out and make it!

*Alex  
Indiana*

### Another Satisfied Patient

I've been using medical marijuana for over five years now. I have neuropathy, a metal disk in my back and a metal collarbone. I was addicted to every painkiller there was until I discovered that the answer was right there in front



**I've just been informed that I've been kicked out of my church for smoking the devil's lettuce, the weed with roots in hell! Oh, Lord, I am a sinner!**

of me this whole time. Just a year and a half ago, I got off all the painkillers and went to just smoking and eating cannabis to help with my pain. Now I grow it, and I've never been happier.

*Robert Machowicz*

### Whence the Munchies?

I have a theory that the munchies are not a reflection of *rising* levels of THC in the brain, but rather of *falling* levels. We know that inhaled vapor results in peak blood levels in seconds, with those levels starting to decline after a few minutes. The THC goes into the body's fat, including the brain. Now if THC caused the munchies, one would feel the need to eat as soon as one stopped inhaling. But it's my perception that the munchies come afterward, perhaps as much as a couple of hours later, when the blood levels of THC are way down and the THC is exiting the brain into the blood.

Why is this important? Well, we neuroscientists know some of the circuitry in the hypothalamus related to eating and satiety, and some of the things the CBI receptor can do there. If THC sticking to CBI receptors promotes irrational hunger (the munchies), that would entail some inhibition of the satiety neurons and/or

of the incoming inhibitors of the hunger neurons. If, on the other hand, it's the departure of THC from the CBI receptors that promotes irrational hunger, this implies the opposite pattern of excitation and inhibition.

Now, it's unlikely that there will be a research project anytime soon offering good cannabis vapor and food so that the researchers can pinpoint how soon users go to the kitchen after they inhale—necessary information to clarify if it's the upswing or the decline of THC in the blood that determines when we become irrationally hungry.

*High Times* should poll its readers to find out when they are likeliest to get the munchies: before smoking; during smoking; after 15 minutes; after 30 minutes; or after an hour or more. Some may respond "all of the above," but if "after an hour or more" is the most popular choice, *High Times* will have helped to document that munchies are really the first sign of "withdrawal" after getting high.

Thanks for your consideration.

*Joseph McSherry, MD, PhD*

Interesting idea. Hey, everybody, go online and respond to our current poll, "When Do the Munchies Set In?"

### Parenting Nightmare

I went to jail for 64 days for possession of pot and a glass pipe, but that's not the important part of my story. While I was there, my 2-year-old was taken away from me. I was never given a chance to work out a case plan with my child. Instead, I was called a drug addict because I smoke weed for anxiety. (Ironically, I've tried pills for it and don't like the way they make me feel.)

To skip ahead, my child was placed with her father despite the allegations of abuse against him. While in his "care," she was beaten several times. I am a great mother, but taking away the one thing I can use for my anxiety means that my heart problems will get worse when I'm stressed. Plus my child is now in foster care with strangers and has two black eyes and a busted mouth. All in all, the authorities gave her to an abusive father to be hurt over and over, rather than keeping her with a loving mother, because of one fact: The mother used pot.

*Jessica H.*

# Big Buddha Seeds

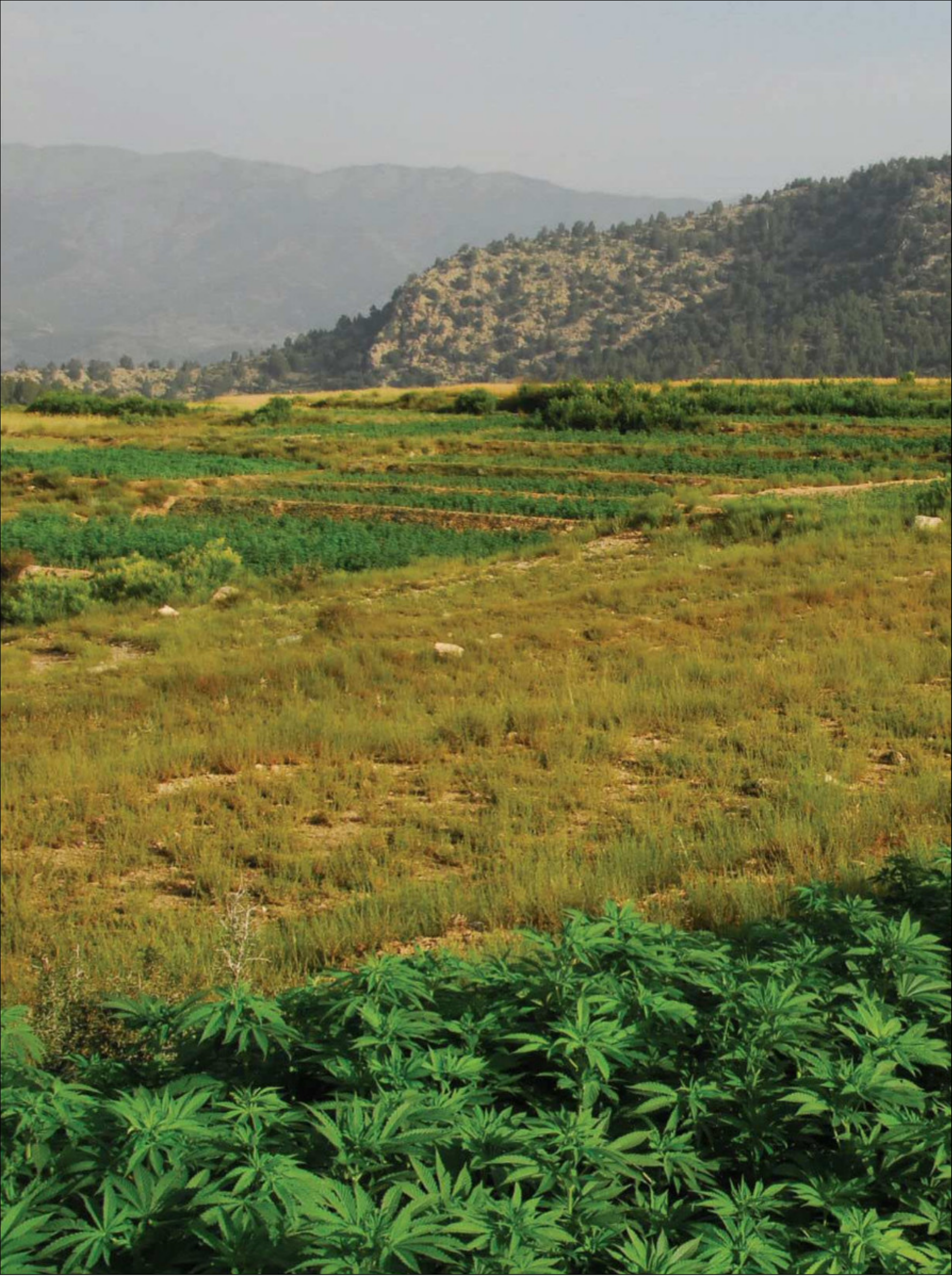


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**FIELD OF GREEN** When US troops were deployed in Afghanistan, they found themselves in a strange land, made even stranger by the vast fields of cannabis they encountered while on patrol. Cannabis is a cash crop for Afghans and has been cultivated for generations. A soldier tells the tale of his tour in "The Green Zone" on page 72. *Photo by Jack Porter*

**Contact  
High**







**LET THERE BE LIGHT** From LEDs to plasma lights, from new digital HPS systems to ceramic discharge lamps (CDLs), we dive into the latest lighting technologies and explore what they have to offer the world of cannabis horticulture. Nico Escondido and Harry Resin set out on an expedition of illumination! Check out "Electric Sunshine" on page 45. *Photo by Nico Escondido*

**Contact  
High**



**Contact  
High**

**AN AFGHAN TALE** Several varieties of *indica* seeds from Afghanistan or Pakistan arrived in North America in the 1970s. Afghani # 1, Mazar-i-sharif and Hindu Kush were some of the earliest introductions and are still available today. Many more Afghan strains grow in pot gardens worldwide—like this one in California. *Photo by Lochfoot*





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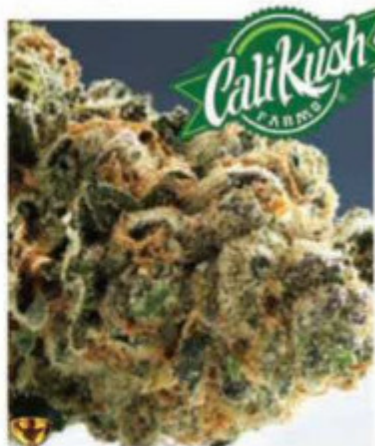


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**Mega Wellness OG  
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**Emperor Cookies  
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2nd PL Hybrid - Flower, grown by  
Cali Kush Farms, strain by  
Nameless Genetics



**Mega Wellness  
OG**

3rd PL Hybrid - Flower, grown by  
Nameless Genetics entered by  
The W.E.E.D.



**Kush Company OG  
Live Resin**

3rd PL Indica - Concentrate  
extracted by Natures Lab  
entered by The W.E.E.D.

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**Wellness OG**

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**Kush Company OG**

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# Highwitness News

**Daltrey Goes Apehit!**



## Entertainment

### Ty Dolla \$ign

Cali *indicas* make for smooth rhymes from this Taylor Gang star. p.34



## Food

### Lavender Pot Cookies

Aromatic elevation. p.40



Are black farmers being discriminated against?



## Dark Clouds in the Sunshine State

Black farmers in Florida are fighting back against the ludicrous discrimination policies imposed by the state's new medical marijuana law. *By Jon Gettman*

Last year, Florida passed the Compassionate Medical Cannabis Act—which wasn't really a medical cannabis act, but rather a bill to make CBD legally available in the state. The bill legalizes the cultivation and distribution of “low-THC cannabis,” which is defined as having “0.8 percent or less tetrahydrocannabinol [THC] and more than 10 percent of cannabidiol [CBD],” intended for use by qualified patients to treat seizures, muscle spasms and other ailments for which there is no satisfactory alternative treatment.

The bill also requires the establishment of an Office of Compassionate Use to maintain a patient registry and create regulations. The law authorizes only five dispensing organizations, one for each region of the state. To apply for a license as one of the five, an enterprise must have “operated as a registered nursery in this state for at least 30 continuous years” and must be able to cultivate 400,000 plants.

And that's where the black farmers of Florida come in.

Black farmers in the United States recently won a federal class-action lawsuit charging the US Department of Agriculture with discriminatory lending practices between 1981 and 1996, which restricted their ability to compete. Thanks to these practices and other factors, most black farmers in Florida have not been in business for “at least 30 continuous years.”

As originally reported by the News Service of Florida, Howard Gunn, president of the Florida Black Farmers and Agriculturalists Association, is seeking a repeal of the 30-year rule and the minimum number of plants, arguing that thanks to these arbitrary requirements, “they have carved out most of the small farmers—not only the black farmers, but the small farmers”—from participating in the program. “We can't compete with those companies,” Gunn said. “It's just a shame. It's a travesty.”

State Senator Rob Bradley, a leader in the effort to pass the original bill, is behind the new legislation regarding nursery selection. His colleague, Senator Oscar Braynon, has been pushing an amendment to address the complaints of black farmers. In April, the new bill was postponed; its two co-sponsors—Bradley and Senator Jeff Brandes—said they planned to keep working on it throughout the summer.

Bradley and Brandes would also like to raise the amount of THC permitted under the CBD bill. One of the problems they're facing is that the original regulatory structure was designed to service the needs of a relatively small population of patients. Raising the THC level would expand the program by adding those who would benefit from medical access to THC. But a bigger program means more cannabis plants, resulting in a larger market to regulate and monitor. For legislators, this means the regulatory framework they had approved earlier has to be re-examined.

There are additional problems with the original bill. As the black farmers

« have pointed out, its restrictions don't allow fair competition for the available licenses. These tight controls enable the state to reward a few chosen businesses and shut everyone else out of the emerging industry thanks to a regulatory system so unnecessarily complicated that it's both inefficient and vulnerable to abuse.

That regulatory framework, as devised by the Office of Compassionate Use, was challenged in court earlier this year. The law requires that dispensary licensees have the financial ability to maintain operations for two years and must post a \$5 million performance bond. The proposed regulations also require that applicants have the "technical and technological ability to cultivate and produce low-THC cannabis," as well as other "experience cultivating cannabis and familiarity with genetics, extraction, [and] routes of administration."

Baywood Nurseries of Apopka challenged these proposed rules as vague and unfair. But in May, that challenge was thrown out by a Florida Division of Administrative Hearings judge who concluded state rules amounted to a

## It's estimated that only about 75 nurseries in the state meet the 30-year requirement and have the capacity to grow 400,000 plants.

"reasonable, rational interpretation" of the state law enacted last year.

It's estimated that only about 75 nurseries in the state meet the 30-year requirement and have the capacity to grow 400,000 plants. But Baywood Nurseries' lawyer argued that requiring a \$5 million performance bond will shut out 80 to 90 percent of these nurseries as well.

And here's another oddity about the state's approach to the regulations: Nurseries co-owner Heather Zabinofsky has stated that she has prior experience growing cannabis through assisting medical marijuana patients. But the attorney representing the Florida Department of Health criticized Zabinofsky for this violation of state and federal law—despite the requirement that applicants have "experience cultivating cannabis"!

Still, even with this bureaucratic paradox, the state's Department of Health said the ruling clears the way for a high-CBD,

liquid strain of pot to be made available by year's end—about a year past what the legislature wanted as its original start-up date. "The department remains committed to ensuring safe and efficient access to this product for children with refractory epilepsy and patients with advanced cancer," the Florida Department of Health said in a statement. "We are moving swiftly to facilitate access to the product before the end of the year."

The complaints by Florida's black farmers and smaller businesses like Baywood Nurseries are just the early-warning signs of the inherent problems with establishing suffocating controls over any legal marijuana industry. Regulations that make the legal production of marijuana more complicated than illegal production are obviously counterproductive: They inhibit competition, inflate prices, delay public access and otherwise work against the public interest. ✨

### HIGH FIVE

## Good Cop, Better Cop

A host of current and former members of law enforcement speak out in favor of legal pot. *By Mark Miller*



**State Rep. Mark Dion**  
(D-Portland, ME)

Dion introduced legislation in March to tax and regulate recreational sales in Maine. Previously on the board of a medical marijuana business, he seeks to transition the state from a dispensary program to full-blown retail stores. Dion, a former member of the Portland Police Department for 21 years and a County sheriff for 12, he wants anti-pot resources shifted to battle deadly drugs like heroin and meth. Dion is also involved in putting a measure on the 2016 ballot if a tax-and-regulate bill can't be passed.



**Chief Mike Koval**  
(Madison, WI)

Chief Koval of the Madison PD offered endorsed legalization in a September 2014 interview with the *Wisconsin State Journal*, calling pot prohibition an "abject failure." He believes pot busts should cease being the focus of the War on Drugs. Koval urges regulation and taxation instead, with the revenues used to provide treatment for those abusing dangerous drugs. Koval doesn't shy away from addressing the racial inequity of cannabis arrests, noting that blacks in Madison are busted for pot at 12 times the rate of whites.



**Officer Tony Ryan**  
(Denver, CO; retired)

A member of the influential activist group Law Enforcement Against Prohibition (LEAP), Ryan was so effective in his role as a pro-legalization speaker in Colorado in 2012 that opponents of Amendment 64 (the voter initiative that legalized recreational pot in the state) resorted to characterizing the 36-year veteran of the Denver Police Department as a "rent-a-cop." Ryan was also the keynote speaker at the 2013 St. Louis Cannabis Conference and stumped for legal weed in Oregon the following year.



**Superintendent Richard Van Wickler**  
(Cheshire, NH)

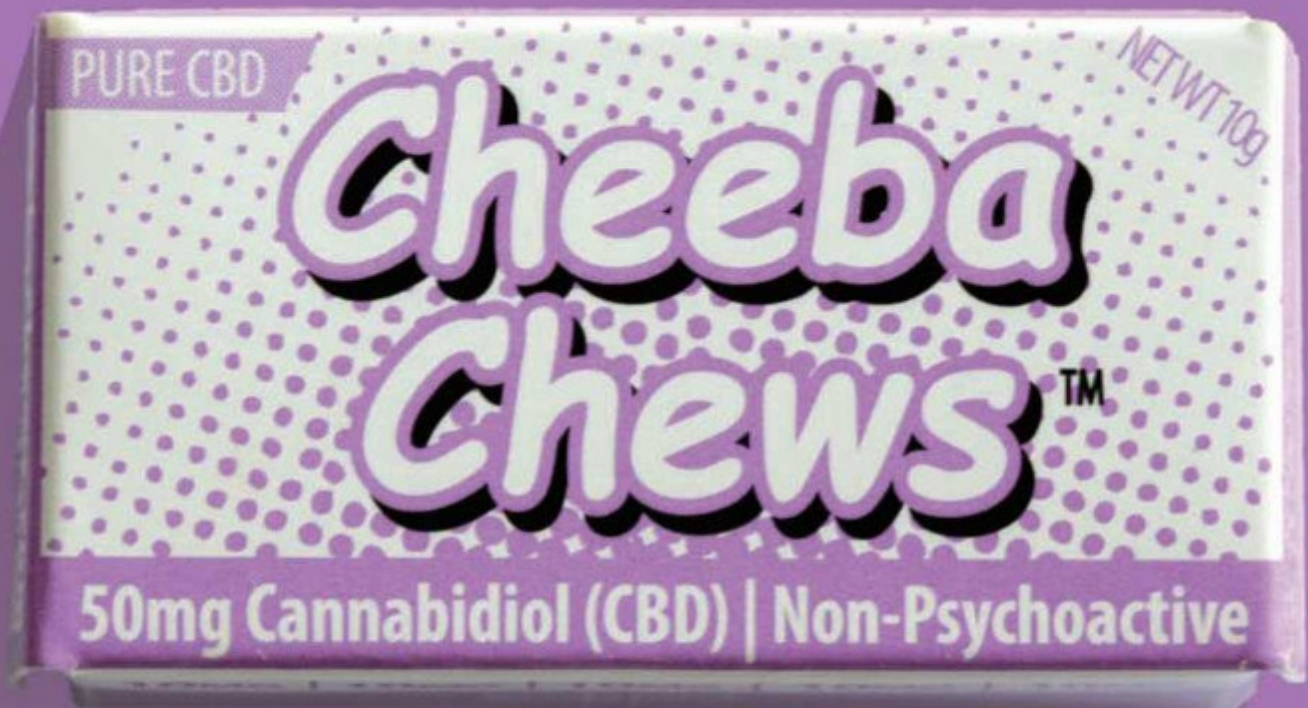
Another member of the LEAP speakers' bureau, Van Wickler is the epitome of integrity—in fact, his anti-prohibition stance theoretically threatens the very existence of his job as a county-prison superintendent! Now in his 22nd year as one of the most progressive prison supes in the nation, Van Wickler testified in 2013 in support of legalizing marijuana in New Hampshire. Among his arguments is this undeniable fact: Legalizing pot in other states has not resulted in increased crime.



**Chief Cathy Lanier**  
(Washington, DC)

Lanier publically supported a voter-approved "soft legalization" initiative in February 2015, despite threats by a Republican-controlled Congress to nuke the law. Lanier has downplayed concerns over legalized cannabis in DC, describing Initiative 71 as "a small change. We've embraced it." She says alcohol is "a much bigger problem" and that "marijuana smokers are not going to attack and kill a cop." Lanier says weed busts "make people hate us."





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## Flav Caught With More Pot

Hip-hop icon and reality-TV star Flavor Flav is in trouble with the law once again. The erstwhile Public Enemy rapper was arrested in Las Vegas for driving under the influence and marijuana possession.

Flav—whose real name is William Drayton Jr.—was caught doing 73 in a 45 mph zone and pulled over by the Nevada Highway Patrol. According to officials, the 56-year-old was charged with speeding, DUI, misdemeanor pot possession and having an open container of alcohol.

Flav likely shouldn't have been behind the wheel at all, since he was driving with a suspended license and suspended registration. He was released later that day after posting \$7,000 bail.

The incident is the latest in a string of arrests for Flav, who has also been busted for domestic violence, illegal fireworks and, in January 2014, speeding and pot possession while on his way to his mother's funeral.

## Cops Crack Down on Hempcon

Hempcon's 2015 Las Vegas event was marred by a pervasive police presence that resulted in 10 people being arrested for selling pot to undercover officers directly from their vendor booths. The police seized pot, hash, seeds, edibles and magic mushrooms. Medical marijuana is legal in Nevada for registered patients; however, it's illegal to sell pot without a license.

Hempcon organizers expressed regret for the situation via Facebook: "It is sad that our industry is subject to such indiscriminate and prejudicial behavior by law enforcement."

### BUDS FLY FREE



Three Southwest Airlines baggage handlers at Oakland International Airport were busted for allegedly being part of an interstate smuggling ring. In all, 14 people have been charged with conspiracy to distribute marijuana and possession with intent to distribute 100 kilograms or more. Authorities say the smuggling ring was in operation for nearly three years.

In a scheme straight out of some blockbuster Hollywood thriller, the baggage handlers allegedly carried weed-filled duffel bags past the screening areas, which they were able to bypass with their security badges, then passed them on to their co-conspirators, who had already cleared the screening checkpoints. The pot-bearing passengers would then board their flights to distribute ganja in cities across the country.



## Won't Get Stoned Again

Legendary '60s rockers The Who are in the midst of their 50th-anniversary tour—and, unfortunately, it shows. At a recent gig at Long Island's Nassau Coliseum, lead singer Roger Daltrey issued an unfriendly ultimatum to an audience member: Either quit smoking weed or the show is over.

Apparently, the fan's copious cannabis consumption was sending a steady stream of smoke onto the stage, irritating Daltrey, who is sadly allergic to pot smoke (it affects his voice and turns him into a whiny asshole).

The 71-year-old singer exclaimed, "My voice is shutting down!" and informed fans that "the show will be over" if the pot smoking didn't stop immediately.

Grumpier-than-thou guitarist Pete Townsend then suggested that the fan dispose of the joint by sticking it "up his fucking ass."

The fan ditched the joint and the show continued. However, second-hand pot smoke is an occupational hazard for rock stars. Perhaps it's time for Daltrey to hang up the mic for good—before he starts yelling at Who fans to get off his lawn.



## Court Contemplates Canadian Medibles

In the first medical marijuana case to be heard by the Supreme Court of Canada, the federal government's appeal of an edibles provider's acquittal could backfire on the Crown and eventually legalize cannabis derivatives nationwide.

The feds are appealing the acquittal of Owen Smith, formerly the head edibles provider for the Cannabis Buyers' Clubs of Canada, who was busted in 2009 for possessing THC cooking oils and edibles.

Central to the case is a clause in Canada's Controlled Drugs and Substances Act allowing patients to consume medical marijuana only in dried-flower form via smoking or vaporizing. Smith's attorney, Kirk Tousaw, argued before the Supreme Court that the dried-bud exemption is arbitrary and violates the constitutional rights of authorized cannabis patients.

The high court's ruling, which could expand Canada's medical pot law to include THC-infused products, will be issued later this year.



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## Funny Money

In 2013, Yavapai County Attorney Sheila Polk facilitated the donation of \$50,000 in anti-organized-crime RICO funds to a local substance-abuse organization, MATForce, for the purpose of opposing marijuana legalization in Arizona.

The drug task force Partners Against Narcotics Trafficking (PANT) had seized the funds, which were then doled out to MATForce shortly after the Marijuana Policy Project confirmed its 2016 legalization campaign in Arizona. Polk, a legalization opponent who is on the boards of both PANT and MATForce, was accused of circumventing a state ban on officials using public resources to influence elections.

However, State Attorney General Mark Brnovich issued an opinion that public resources could be used to “educate” the public on the evils of marijuana—as long as the anti-pot campaign doesn’t explicitly tell people how to vote. The opinion touched off a wave of criticism and has since been withdrawn by Brnovich.

## Consistency is King

Fed up with harsher punishments for a less harmful substance, a South Dakota marijuana activist has decided to drive his point home by making tobacco and alcohol illegal.

Bob Newland founded the group Consistent South Dakota with the goal of highlighting the state’s inconsistent regulation of tobacco, booze and pot.

If he can gather enough signatures, Newland will place a measure on the November 2016 ballot that asks South Dakotans to outlaw the transfer of tobacco and the sale of drinks containing more than 1 percent of ethyl alcohol. Under Newland’s proposed bill, penalties for violating the tobacco and alcohol prohibitions would be in line with South Dakota’s current penalties for pot.

“If you’re going to put them in jail for a benign herb, they should be put in jail for alcohol and tobacco—the deadly drugs,” he explained.

In 2009, Newland was sentenced to 45 days in jail for pot possession.

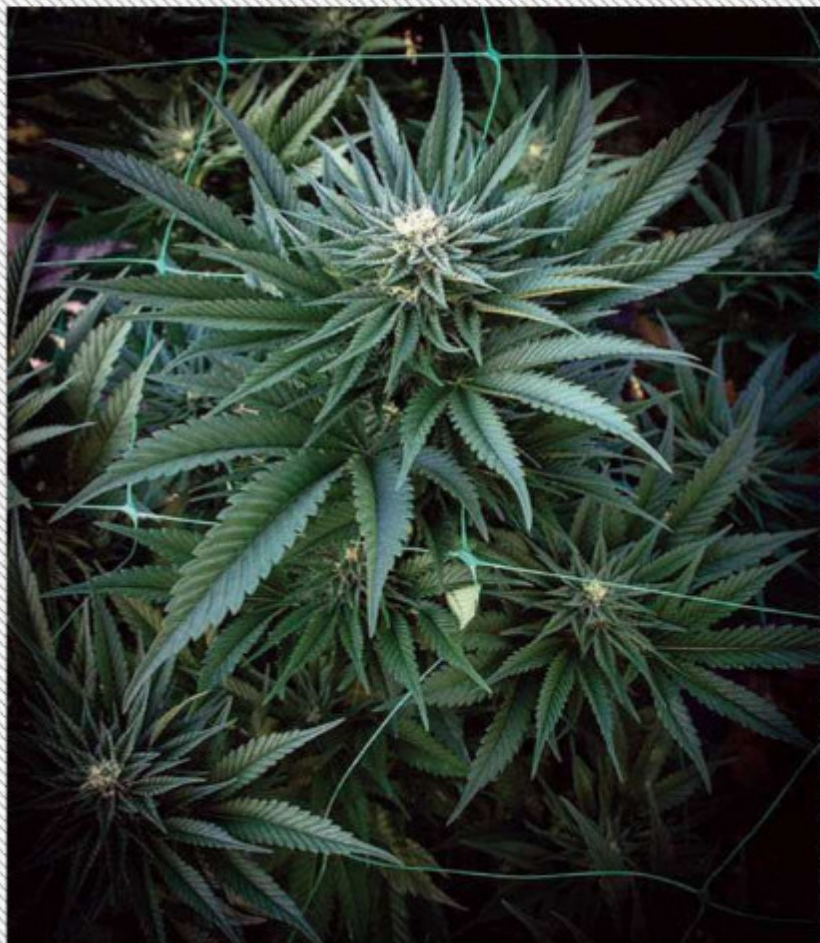
## COPS TRIP ON DRUG-LACED PIZZA



Two Israeli police officers were hospitalized after eating a pizza topped with synthetic marijuana. Police in Tel Aviv narrowed the cause of the hallucinations and vomiting experienced by the officers to a pizzeria in Holon and questioned its owner, who admitted that he’d added synthetic pot, called Mr. Nice Guy, to the pie.

The owner of the restaurant explained, “I knew the order was placed by police officers... But the officer who called in the order seemed cool—plus he told me to add whatever toppings I wanted... So instead of oregano, I sprinkled some Mr. Nice Guy.”

The owner was arrested, and the police plan to shut down the pizzeria over health concerns, even as the leftover pizza undergoes further testing. Israel banned synthetic pot in 2011.



## Cultivation Ban Overturned in Cali Town

Medical pot patients and providers in Clearlake, California, will once again be able to cultivate cannabis after the City Council rescinded a weed-growing ban. Local legislators had approved the ordinance outlawing ganja gardens in February, but changed their minds when faced with a lawsuit and a signature-gathering campaign that would have forced the officials to either kill the ban outright or place it on the ballot for voters to decide.

Instead, Clearlake lawmakers compromised by amending the ordinance that previously allowed each household to grow up to 12 plants. The new rules permit up to six cannabis plants per household.

The lawsuit and signature campaign will be abandoned now that medical pot can again be legally harvested in this Northern California town.

## Gov Commutes Pot Prisoner’s Life Sentence



Mizanskey

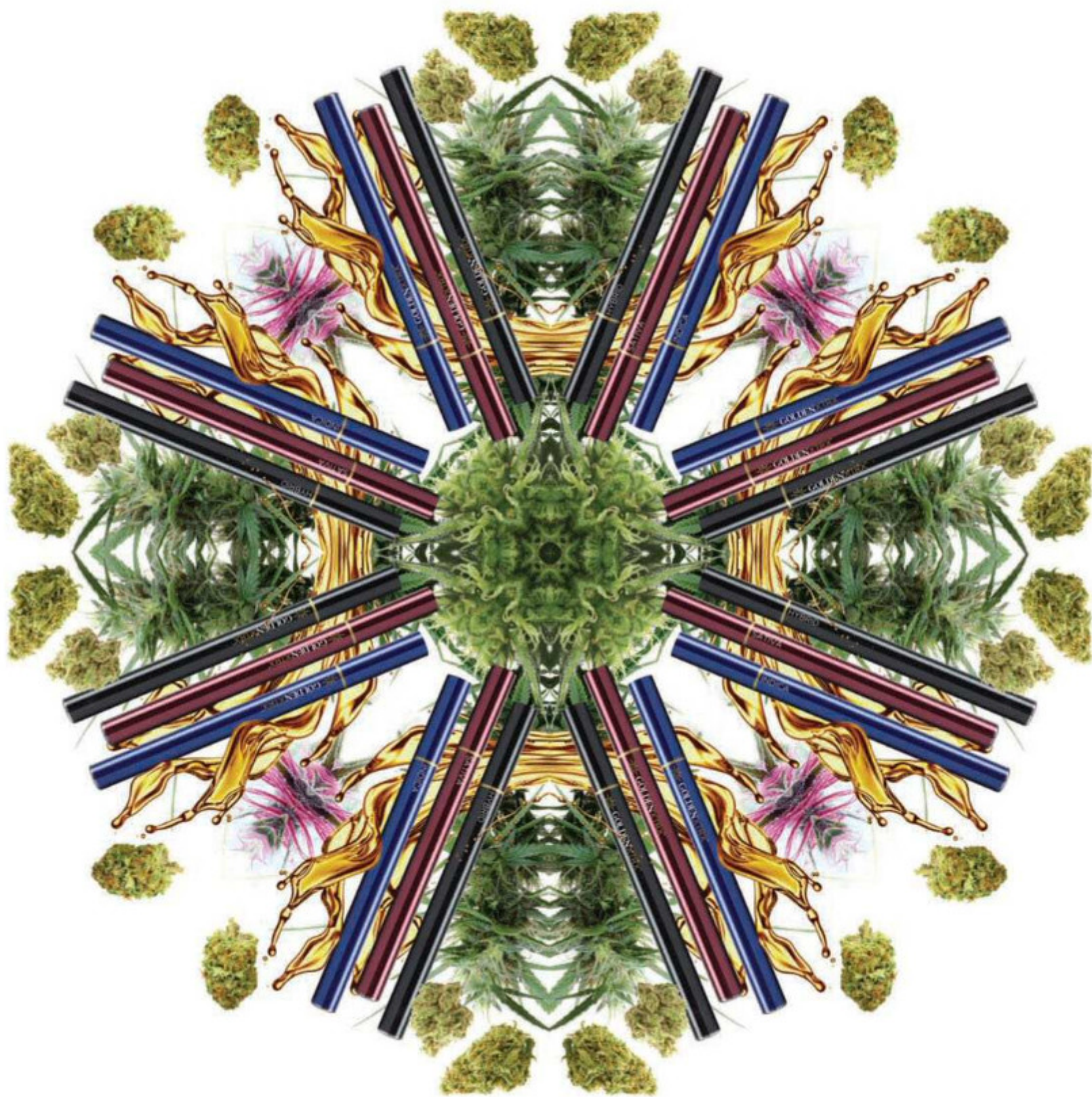
Missouri Governor Jay Nixon has commuted the sentence of Jeff Mizanskey, a nonviolent pot prisoner serving a life sentence. This means that Mizanskey, who has spent the last 20 years in the Jefferson City Correctional Center, is now eligible for parole.

Mizanskey was originally sentenced under a draconian three-strikes law that has since been repealed.

While the commutation doesn’t guarantee that he’ll be released, Mizanskey may now bring his case to the parole board.

“In the case of the commutation, my action provides Jeff Mizanskey with the opportunity to demonstrate that he deserves parole,” Governor Nixon explained.

Marijuana activists from Missouri NORML and Show-Me Cannabis championed Mizanskey’s case after Nixon failed to pardon him while freeing nine other nonviolent offenders in December 2014.



 #goldenxtrx

## HIGHWIRE

## Dispatches from the international drug war. *By Bill Weinberg*



Cancer threat

### Carcinogen in Anti-Coca Spraying

On March 20, the International Agency for Research on Cancer, an arm of the World Health Organization (WHO), officially reclassified glyphosate as a cancer threat. The reclassification was big news in Colombia, where the government has sprayed more than 4 million acres with glyphosate over the past 20 years to eradicate coca crops.

The spraying has long been opposed by Colombia's left, which likens it to the Pentagon's use of Agent Orange during the Vietnam War. But the WHO findings may not mean an end to the practice. "Without a doubt, this reopens the debate on fumigation and causes us to worry," said Colombian Health Minister Alejandro Gaviria, speaking to the Associated Press. "But," he added, "these are interests here that transcend [the science]."

### Yemen War Fuels Dope-for-Guns Trade

The escalating crisis across the Middle East was ratcheted up in March as Saudi Arabia and its Gulf State allies attacked Yemen, launching airstrikes against the Shiite rebels who have seized much of the country. Within Yemen, Sunni tribes and militants in



Supporters march in Bogotá.

### In Colombia, Peace Efforts Bear Early Fruit

Colombians made history on March 8, as tens of thousands took to the streets in a nationwide "March for Life" to show their support for peace talks between the government and the FARC guerrillas. President Juan Manuel Santos joined the march in Bogotá. Since then, there have been some encouraging signs that the country's decades-long armed conflict really is coming to an end.

Up to that point, the government hadn't responded to a unilateral FARC truce, continuing to carry out operations against the guerrillas despite the ongoing peace talks in Havana. But days after the March for Life, the government agreed to suspend its bombing raids on FARC strongholds.

Al Qaeda's orbit are also battling Shiite rebels.

Both sides in the bitter Sunni/Shiite divide—equally intolerant of hashish smokers and khat chewers, and equally eager to execute them—are turning to the dope trade to fund their arsenals. As the war has escalated in Yemen, so have seizures of hashish along its borders. Saudi Arabia's *Arab News* reported on March 6 that border guards foiled an attempt by "infiltrators from Yemen" to smuggle a whopping 200 kilograms of hashish into the kingdom in backpacks.

### Burma Opium War Spills Into China

A Burmese MIG-29 fighter jet carried out an airstrike on Chinese territory on March 13, killing four people working in a sugar-cane field in Yunnan province. Chinese



The conflict continues.

authorities registered a diplomatic protest, and Burma issued a statement expressing "deep sorrow" over the deaths. It was the latest development in the fast-escalating war in Burma's northern Shan state, where the rebel army of the Kokang ethnicity has again taken up arms. More than 50,000 people—mostly Kokang—have fled into Chinese territory since the war reignited this year, and Burma accuses military commanders in China of allowing the rebels to establish a staging area in the border zone.

This puts Beijing in a pickle, since it has traditionally been a sponsor of the Burmese regime—all the more so because the Kokang people are ethnic Chinese. Pressure from below is mounting on China's rulers to come to the aid of the Kokang. Sina Weibo (China's answer to Twitter) has been abuzz with grisly pictures of Kokang corpses, with messages like "Let us help Kokang." In a message in February, the commander of the Kokang rebels, Peng Deren, thanked Chinese cyber-activists for their support.

Peng is the son of the rebels' longtime political leader, Peng Jiasheng—who was identified by the DEA as a "major trafficker" as far back as 1975. The rebels say they now oppose the opium trade and have been cooperating in



Opium poppies

eradication efforts.

But a key to understanding the new fighting in Shan may lie with the February 23 arrest in Yangon (Burma's major city) of Li Guoquan, a prominent ethnic-Chinese "businessman," on unspecified charges. On March 5, Li mysteriously died in custody—with Radio Free Asia citing dissidents who claimed he was tortured to death. RFA also asserts that Li was Peng Deren's brother-in-law and was suspected of financing the Kokang rebels.

Whether or not Li's business in Burma included opium, it is clear that control of the illicit trade has long fueled the cycle of pacification and rebellion among the ethnic armies of Burma's north. In various bids for peace, successive regimes have cut deals with the rebel armies for sharing opium proceeds, then fallen out over the terms and returned to war. What makes it especially dangerous this time is the involvement of China—with the potential to internationalize a conflict long hidden from the outside world. ✨

*For updates on these and other stories, see Bill Weinberg's websites, GlobalGanjaReport.com and WorldWar4Report.com.*

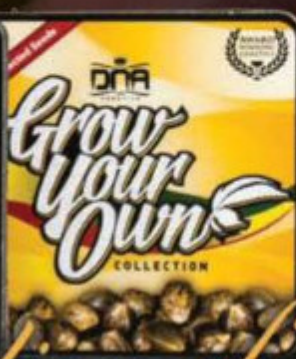
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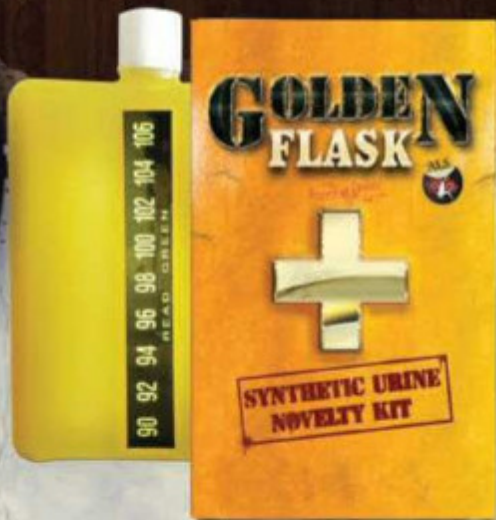
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## What a Scoop!

Inspiration often strikes when your consciousness is elevated. That was the case for dedicated marijuana smoker and plastics engineer Pit Demmer, a German living in Belgium. Demmer works with hemp and corn plastics, and as he was musing about his love for all things cannabis, he had a “eureka” moment: Why not use the 100 percent, CO<sub>2</sub>-neutral waste scraps generated by his engineering work to enhance his leisurely pursuits? Et voilà, the Scoop was born! The unique little tool’s handle breaks up bud easily, and then scoops it into your vape, bowl or cone with no mess. You won’t waste a single crumb of precious herb. Get your own Scoop by emailing [pit@technoprint.de](mailto:pit@technoprint.de).



## A Real Gem

Once deemed “a stoner’s necessary accessory” in the pages of this magazine, Alex Streeter’s iconic Dope Ring is more fitting than ever for the high rollers among us. The hand-crafted stone gleams in its hefty sterling-silver setting, impressive yet understated. At a glance, it looks like green amber—but upon closer inspection, you can see that it’s much more precious than any regular old resin. Available online at [alexstreeter.com](http://alexstreeter.com).

## Flying Higher

The world’s first hemp plane will take flight later this year, possibly revolutionizing the aircraft industry.

**Derek Kesek** of the Canadian company Hempearth is looking to change the face of aviation via hemp. He’s in the midst of building the world’s first hemp airplane, with the goal of having at least 75 percent of the plane itself made from hemp fiber and 100 percent of the fuel made from hemp ethanol.

Kesek told *High Times* that he wants to “basically revolutionize the aviation industry using industrial hemp. That’s what the goal is.” He continued: “I see fleets of hemp planes or companies like UPS, these big places [like] Boeing ... taking a step forward. I know a lot of companies are interested, but no one’s really stepped into it. So you do something like this to get the public interested.” And with the lower cost and much smaller carbon footprint that comes with using hemp materials, revolutionizing the industry is more than just a pipe dream.

The prototype is a sleek little four-seat, 360-horsepower, double-engine plane that looks a bit like a jet. The outer shell, made entirely of hemp, will also be the light tan color of natural hemp fiber. Experts have compared the strength and durability of hemp fiber with fiberglass—the material that airplanes are traditionally made



The prototype taking shape



Ready to fly

from—and found that hemp is just as strong, if not stronger.

Kesek estimates that they could have the first hemp plane built and ready to launch within eight months. The designs are finalized; the Wright brothers’ original launch site in Kitty Hawk, NC, is booked; the Discovery Channel is set to film the proceedings; and the crowdfunding is off and running. There’s still time to donate, however, and everyone who contributes a dollar or more will have their

name appear in a mosaic-style logo on the plane.

To follow the hemp plane’s progress and become part of its historic launch, visit [hempearth.net](http://hempearth.net). There, you can make a donation, visit the Hempearth store, catch up on the blog and find out what’s next.

“I’m probably going to build a hemp helicopter after this one,” Kesek says, “and then I don’t know what. But [I’ll] just keep it interesting, innovative, different and exciting for people.” *Mary Ought Six*

## SPOTLIGHT

### Sunshine Joy’s 3-D Tapestry

Taking wall hangings into another dimension, the Rhode Island company Sunshine Joy has created a line of three-dimensional tapestries: colorful prints that turn totally psychedelic when you slip on the accompanying 3-D glasses. The kaleidoscopic patterns pop even without special lenses, but you’ll ooh and aah when the rich prints lift off the wall and undulate in front of your eyes. Enjoy watching your friend’s jaw drop when you pass him or her a set of specs—after you share a joint, of course. Just like college all over again! The wall hangings also work as bedspreads, picnic blankets, curtains or sofa throws. Available in a dazzling array of stereoscopic designs at [sunshinejoy.com](http://sunshinejoy.com).



# West Coast Wonder

Cali *indicas* inspire Ty Dolla \$ign to produce some of the most infectious R&B coming out today. *By Abdullah Saeed*

## California's astonishing cornucopia

of cannabis has bred a discerning type of stoner: one who is acutely aware of the variety in consumer pot products, as well as fastidious in his preferences for this or that strain or concentrate. After years of exhaling blunt smoke in the glare of his production studio, LA's R&B phenom Ty Dolla \$ign has developed a strict preference for *indicas* and a violent aversion to the *sativas* filling so many of the world's pipes.

"It just tastes like shit," Ty says. "Smells bad, everything... It's like stress weed. It might as well have seeds and stems." Regarding his beloved *indicas*: "Better smell, better taste, better high, worth the money."

Rather than *sativa's* well-known creativity-fueling effects, Ty needs weed to soothe his natural volatility—and nothing locks you to a chair like a heavy *indica*. "My fucking temper is crazy, and weed keeps me from panicking," he admits. "It calms me down and keeps me focused on what I need to do. Some people slow down and can't handle their business, but for me it makes me do my shit."

Reports have emerged pinning Ty's consumption level at three ounces of flowers a week. "OG Kush, Jet Fuel, Irene," he says, running down his list of favorite strains. Plus being on the road with label



Ty savors one of his favorite strains.

## "California definitely has the best weed in the world."

mate and fellow weedhead Wiz Khalifa provided Ty with steady access to the Wiz's namesake strain, Khalifa Kush.

Off the road, Ty always returns to his standby, Louis XIII, one of OG Kush's sleeper grandkids. For the sake of flavor-saving, he switched from blunts galore to neatly packed Raw cones.

He's enamored with the utility of that innovation: "I can just hold up a piece of paper and pour the weed right in," he says as he demonstrates.

Ty's long history with flowers still leaves room for dabs, however, especially as a social activity—something to do with the homies. "Dabs are

special," he says. "Like, right, we're gonna be here awhile, we're stationary—bring out the rig!"

In addition to his recreational fondness for the cannabis plant, Ty is among the many West Coasters who take pride in their regional product. "California definitely has the best weed in the world," he states uncompromisingly. "I hope we can legalize it so we can get this weed everywhere else."

But there is a downside: Being raised on Cali's finest can create deep dissatisfaction with lesser bud. "When we go to Australia or Europe or any of those places," he says, "we can't get the weed that we have here." With a note of empathy for those stuck smoking stress weed, Ty adds: "We should spread that love everywhere."

Surprisingly, though, he has doubts that this dream will

come true anytime soon. Ty's home state of California passed the nation's first medical marijuana law, but on the prospect of recreational legalization, "I don't think it's going to happen in 2016." Ty's frustration is evident: "It should have happened before I was born, really." ✨



### Dolla \$ign World

Between blunted tours with Wiz Khalifa and his other Taylor Gang counterparts, you can find Ty in the studio smashing through flowers and conjuring the beats and vocals that make him one of the most creative stoners in rap today.



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The artist inhales before the Eye of God.

# Mining Modern Gems

Star trails and smut, medical oddities and architectural marvels all entwine in Chris Santa Maria's psychedelic collages. *By Mary Jane Gibson*

**Kaleidoscopic swatches** of colorful paper litter the studio loft of Brooklyn-based artist Chris Santa Maria, each piece carefully torn from one of the magazines piled up in milk crates, leaning in unsteady stacks, and scattered across the rough-hewn wooden floor. Santa Maria keeps his paper jewels loosely organized in plastic takeout containers on his worktable, a polychromatic riot of visual information. He assembles these scraps into enormous psychedelic collages that he terms "cultural ramblings."

Those ramblings found a place at the center of the pop-culture landscape when his work was featured by the web series *High Maintenance* (recently picked up by HBO), which follows a weed-delivery guy on his rounds.

In the episode "Qasim," an obsessive Brooklynite is pursuing an "Uberman" lifestyle, devoting 22 hours a day to working out, chronicling his food intake, and creating giant brilliant collages, which the viewer sees in subliminal bursts—an unsettling look into an unraveling, sleep-deprived mind. Those collages hang on Santa Maria's studio walls along with newer, bigger, amorphous ramblings titled, simply, *No. 1* through *No. 7*.

Perhaps the quasi-visionary nature of Santa Maria's work comes from his Arizona upbringing. "I grew up in the middle of the middle class on the edge of the desert," he says. He realized he wasn't happy with his path in college: "I was a business major and I freaked out, 'cause I

**"My relationship with cannabis gives me a certain kind of focus."**

was in this economics class, and I was like, "This goes completely against the grain of my thinking."

So he ditched business school, moved to New York and immersed himself in the world of art, landing a job as the director of top gallery Gemini G.E.L. "It's a place that has nourished me," he says. When Santa Maria isn't

working as an art dealer, he heads to his studio in Bushwick, where he engrosses himself in making things. Often, he smokes a little weed first.

"When I go to work in the gallery, I never smoke because I know exactly what's going to happen: I'm not going to be able to do my job," he notes. "When I come here, my relationship with cannabis gives me a certain kind of focus."

Santa Maria draws on a variety of publications for his pieces: "When it comes to content, I don't discriminate against any source—I go from the smuttiest smut to [laughing] *High Times* magazine." He uses a hectic synthesis of imagery from glossy mags to investigate "how we're inundated with images constantly, and how we process them." The work, from a distance, appears to be arranged by color. Upon closer inspection, the viewer's eye is engaged by a chaotic series of juxtapositions: a perfume bottle, cancerous lesions, a collarbone, a sand dune. You can lose yourself in this world—especially if you're high.

Santa Maria tried weed for the first time in high school: "My best friend and I smoked out of a bong made from a plastic penguin yard ornament. Before I smoked pot, I was such an uptight kid—and then my friend and I smoked and got really, *really* high, and we went on this walk through our neighborhood, and we were like, 'This is amazing! Why is this even wrong? Holy *shit*, do you see the star trail?' Now, when I come to the studio, I smoke a little bit, I get into my work, and it makes it even more enjoyable." 🌿

Visit [chrisantamaria.org](http://chrisantamaria.org).



## Liminal and Luminous

Santa Maria creates his collages by tearing out images carefully by hand—no scissors here—and pasting them onto medium-density fiberboard. He then shapes the MDF with a jigsaw and finishes the pieces with an acrylic gloss.

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These punks will put a hex on you.

## Nuke York

### Howling against the system.

The debut LP from NYC's dark gypsy goth-punxxx finds them riding hell-for-leather through the city's rapidly rising steel-and-glass canyons, lobbing Molotov cocktails into the air-conditioned bank lobbies and marble-countered oyster bars with which the streets of once-gritty "Nuke York" are now lined. Coming on the heels of various cassette demos and a couple of EPs, the album boasts no standout cuts to equal the ferocious "Bone Collector," from their 2012 *Attic Noise* EP; rather, all nine tracks are jagged shards of a blackly glimmering whole, a singular aural experience that pulls the listener into an almost cave-like realm.

Drawing heavily from such '80s death-rock greats as the Damned, Christian Death and Southern Death Cult, as well as that era's anarcho-crust monsters Amebix and the comparatively bubblegummy TSOL, Anāsazi here deliver one long, pre-apocalyptic howl, punctuated by stuttering audio outtakes from telephone conversations and TV shows. Of note in this department is the terrifying,



**Anāsazi**  
*Nasty Witch Rock*  
(Toxic State)

Wendigo-like hiss that opens "Membra Me," which joins a staggering bass and drunken guitar before the song lurches into full throb.

Lyrical references to rat poison ("Horror at the Mass") and enslavement ("Hex Da System") abound; the vocals are drenched in reverb and sound almost eerily distant, which somehow makes the entire album feel like a warning. The chiming guitars lend streaks of color, notably (and no doubt accidentally) recalling the Rod Stewart deep cut "Dynamite" at the beginning of "Thelema's Will," and clanging discordantly and dreamily in the ultimately frenetic "Morbid Native." The production overall is a bit thin, but I think it suits Anāsazi's up-from-the-tunnels, out-in-the-streets style perfectly. The vinyl comes with a 16-page booklet and massive poster. *Polly Watson*

## MUSIC RECOMMENDATIONS



**Kendrick Lamar**  
*To Pimp a Butterfly*  
(Interscope)

Art is often at its most noble when it becomes an arena for creative violence and calls out the ineffectual parasites that squander its blood through collective ignorance and lack of purpose. An artist is often greatest when he attempts to culturally castrate his opponents and

leave them forever obsolete. At that point, the challenged either fall away or come back harder. Aesthetic terrorism was all over Lamar's verse on 2013's "Control." He called out the culture, and they came back at him hard, leaving him with one option: To make this record. His masterpiece. *Josh Chambers*



**Domovoyd**  
*Domovoyd*  
(Svart Records)

Finnish band Domovoyd make acid-trip horror-movie albums disguised as stoner-metal parties. One dead giveaway is the out-of-tune violin intro here: Guests enter, a joint is passed around, everything seems normal—until "Ambrosian Perfume" kicks in and the vibes take a

sinister turn. Moods swing from mellow intros and mumblings about "embracing the air" to explosions of overdriven, cobweb-frying bass. Everyone is good-looking and friendly—until you start wondering what was in that joint, and they all begin to eerily resemble the Manson Family. *Adam Ganderson*



**Amber Ladd**  
*HEART*  
(CD Baby)

Ladd's latest is a cascading display of tripped-out, bass-heavy, electronic goodness. As always, though, the brightest star in her galaxy of sound is her powerful voice. With incredible range, Ladd's larynx lulls, energizes and makes our own HEARTs swell with teased-out emotion. Ladd was featured in

*High Times* in 2010, when her album *tRip* dropped. Marijuana is a huge inspiration for her as an artist, and Ladd herself is as one of the most inspiring individuals to grace the planet: Her impassioned pursuit of dreams, music and the ultimate life high comes through on every track. *Mary Ought Six*

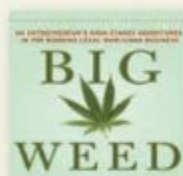
## BOOK RECOMMENDATIONS



**Psychedelic Sex**  
*Eric Godtland*  
(Taschen)

The photos in this tome of porn from the 1960s and early '70s are amusing—at times intentionally. Flashes (pun acknowledged) of wit can't hide the fact that most of these pics of spread-eagled hippie chicks and their hirsute partners were taken by square pornographers intent on

making a buck from freaks shedding their clothes during the erection (oy vey!) of that historical spurt (shoot me, please!), the sexual revolution. The models are often in contortions that remind one of *Twister*. Nonetheless, this is an entertaining read, if reading's what you're here for. *Michael Simmons*



**Big Weed**  
*Christian Hageseth*  
(Palgrave Macmillan)

Ganjanpreneur Christian Hageseth—the founder of Green Man Cannabis, which won the 2014 *High Times* Cannabis Cup in Denver—chronicles how he launched one of the first-ever national pot brands. *Big Weed* takes us from Hageseth's novice days learning about weed strains, through his search

for investors to support his vision, to hiring his award-winning grow team. Hageseth also shares his vision for the Green Man Cannabis Ranch—a canna-tourism destination that he is setting up in Denver, which will offer a tasting room as well as indoor and outdoor grow tours. *Cori Kidney*

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#### MUNCHIES

## Lavender Shortbread Cookies

Delicious cannabis cookies that are also gluten-free!

A rapidly expanding niche of the cannabis-infused-foods industry, gluten-free edibles have become increasingly common on dispensary shelves, as edibles-makers infuse pot into products intended for people who need to follow a sugar-free, vegan or other healthful alternative diet. But just because something is gluten-free doesn't mean it can't be delicious!

Created by Alison Draisin, a multiple Cannabis Cup winner and founder of Ettalew's

Edibles in Seattle, these cookies replace wheat flour with almond flour for a nutty flavor. Gluten is the protein found in wheat flour, and it enables bread and other baked goods to

bind together into a cohesive mass. People who suffer from celiac disease become extremely ill after consuming gluten, while others who are gluten-sensitive prefer to avoid it and say it makes them feel lethargic. Modern hybrid varieties of wheat appear to cause an allergic reaction in many people and are difficult for the body to digest, leading to feelings of chronic fatigue, anemia, nausea, depression, skin rashes and more.

If you think you might be gluten-intolerant, try eliminating it from your diet for a few weeks and see if you feel any different or better. These grain-free cookies contain no refined sugar, are perfect for summer parties, and make an excellent gift for your gluten-free friends who love weed food! *Elise McDonough*

#### CANNABIS COOKIES

##### Cookies:

½ cup cannabutter, softened  
3 tbsp. locally sourced honey  
1 tsp. fresh lavender, minced  
2 cups almond flour  
½ tsp. sea salt

##### Glaze:

2 tbsp. coconut oil  
2 tbsp. coconut butter  
1 tsp. maple syrup  
Save unminced lavender to top the cookies.

In a large bowl, combine the butter and honey using a hand mixer or food processor. Add the lavender, almond flour, and salt and mix well. Shape the dough into an eight-inch roll and wrap in plastic wrap. Refrigerate for at least an hour.

(You can also freeze the dough at this point if you want to save it for a later date.)

After the dough is thoroughly refrigerated, preheat the oven to 325°F. Remove the dough from the plastic wrap and cut into quarter-inch slices. Place on natural-parchment baking sheets, separated by at least an inch. Bake for 15 minutes or until the edges start to brown. Cool for several minutes before removing from the pan.

Next, melt the glaze ingredients in a small pan over medium heat. Stir to mix. Using a spoon, pour the glaze on the cookies and then sprinkle the lavender on them as well. *Stones 18.*





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-Reno, NV

MARKET ANALYSIS

Prices by the ounce

Index Watch: All indices held steady this month with the exception of the Mids Index, which dropped \$17 to reach an 11-month low in September after rebounding from a nine-month low in August. All other indices finished within \$2 of their year-to-date averages.

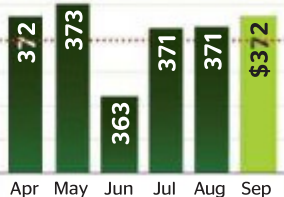
US Price Index

YTD Average: \$297



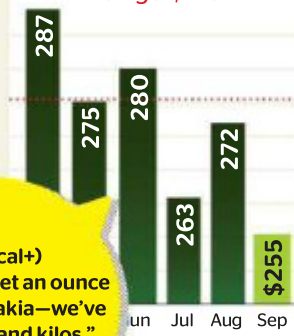
Kind Index

YTD Average: \$370



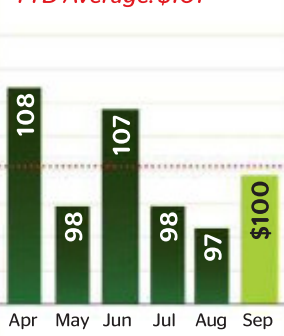
Mids Index

YTD Average: \$275



Schwag Index

YTD Average: \$101



(Critical+)  
"You won't get an ounce here in Slovakia—we've got grams and kilos."  
-Bratislava, SK

TRANS HIGH MARKET QUOTATIONS

STATE	CITY	STRAIN	PRICE
Alabama	Birmingham	Chemdog	\$360
Alaska	Anchorage	Tahoe OG	350
Arizona	Fountain Hills	Bubba Kush	330
Arkansas	El Dorado	Blueberry Headband	380
California	Los Angeles	Death Star	250
	Palm Springs	God's Gift	350
	San Francisco	Deadhead OG	280
Colorado	Colorado Springs	Golden Goat	100
	Denver	Pre-'98 Bubba Kush	280
Connecticut	Portland	Ghost Train Haze #1	300
Delaware	Newark	AK-47	350
Florida	Miami	Super Silver Haze	380
	Orlando	Sour Diesel	400
Illinois	Chicago	Skywalker OG	380
Louisiana	New Orleans	Blue Dream	350
Maine	Portland	Headband	320
Maryland	Baltimore	Chernobyl	300
Massachusetts	Boston	Kosher Kush	350
Michigan	Ann Arbor	Grand Daddy Purps	230
	Kalamazoo	Gorilla Glue	220
Minnesota	Minneapolis	Allen OG	250
Missouri	St. Louis	OG Kush	400
Montana	Bozeman	Blue Dream	280
Nevada	Reno	Master Kush	200
New Jersey	Phillipsburg	Girl Scout Cookies	350
New York	Brooklyn	Strawberry Cough	380
	New York	Sour Diesel	400
North Carolina	Raleigh	OG Kush	375
Ohio	Columbus	Jillybean	325
Oregon	Portland	Jack Herer	150
Texas	Houston	Mr. Nice Guy	265
Virginia	Richmond	Master Kush	375
Washington	Chelan	Sour Diesel	200
INTERNATIONAL			
Australia	Melbourne	Mango Kush	280AUD
	Sydney	White Widow	300
Canada	Charlottetown	Purple Kush	C\$225
Costa Rica	San Jose	Amnesia	\$300
England	Somerset	Lemon Kush	£200
Mexico	Hermosillo	Jarilla	140MXN
Slovakia	Bratislava	Critical+	240€

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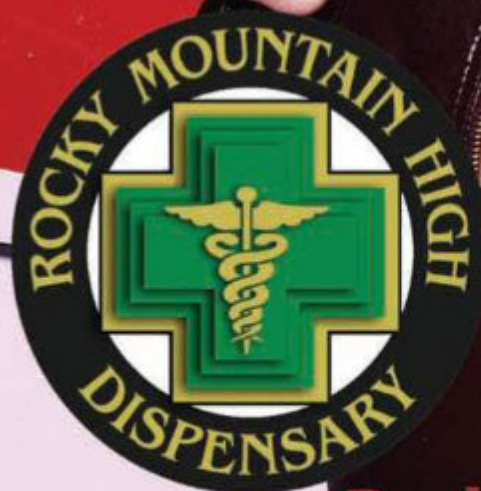
(Jarilla)  
"A good quality, short-flowering, sativa-dominant hybrid."  
-Hermosillo, MX



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CDL light spectrum closely resembles the sun

# "SunBright"



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### Daisy Chain Connection



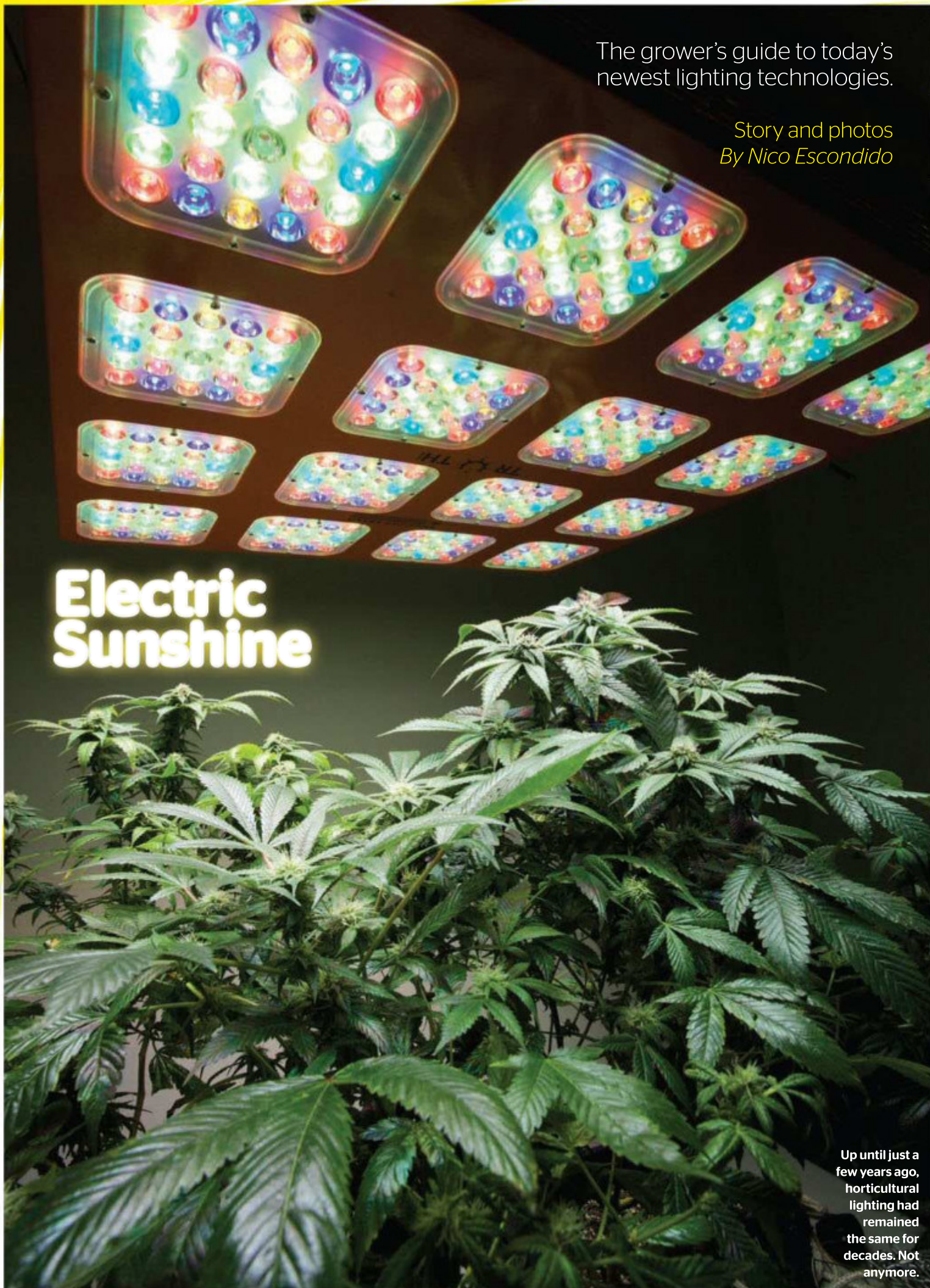
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The grower's guide to today's newest lighting technologies.

Story and photos  
By Nico Escondido

# Electric Sunshine

Up until just a few years ago, horticultural lighting had remained the same for decades. Not anymore.



Digital lighting, like this Gavita Pro, was among the first to push HID technology forward.

**F**or nearly 40 years, indoor horticultural lighting has changed very little: We've continued to use the same high-intensity discharge (HID) lamps with high-pressure sodium (HPS) or metal-halide (MH) bulbs. Yet when we want to see better results from our plants, we tend to look down at our grow mediums and nutrient programs ... always forgetting to look up at our electric sun.

Then came the first new advance in lighting, a change from the traditional core-and-coil (or magnetic) ballasts to the more energy-efficient electronic (or digital) ballasts. After that, the floodgates really opened. First came the rush of new digital HID bulbs that were more compatible with these ballasts. Next came the LED revolution. And now we have plasma lamps,

induction lighting and ceramic bulbs. It's a good time to be a photobiologist!

But which of these new technologies are best for our cannabis plants? Which are ideal for full flowering cycles, and which are more suited for the vegetative stage? Which are most useful as supplemental lighting with HID bulbs? And how exactly should we be measuring and comparing these lamps?

We've heard your questions, and we agree that some objective and unbiased testing is needed. So we went out and got ourselves the best scientific instruments that money can buy; collected an assortment of today's newest lighting technologies; and set out to run our own tests to determine which lamps are the best for our indoor gardens. It certainly wasn't easy, but in the end, we were impressed.

## Light Science

To start, how does one compare and measure different light sources? When it comes to plant science, there are two main considerations: light quality, in the form of spectrum, and light intensity, in the form of energy. When comparing new lighting technologies, we need to measure both of these aspects.

We deployed a highly sensitive and specially calibrated spectro-radiometer to measure each bulb's light quality and to produce a spectral curve showing the range of spectrum emitted by each lamp. A spectro-radiometer is the best device for accurately measuring PAR, or photosynthetically active radiation, as it provides intensity readings at each wavelength or color as well as for the spectrum's overall range.

## Measuring Light

Many bulb manufacturers incorrectly state their product's light intensity using lumens as the unit of measurement. However, lumens are a unit of measurement for the human eye; photobiologists and botanists use PAR to measure the effects that horticultural lighting will have on plants. The spectrum is measured in nanometers (nm), representing the wavelength of each color frequency.

## Light Quality

Photosynthetically active radiation is the spectrum of light that plants use for photosynthesis. PAR is typically defined as the spectral range of solar radiation from 400 to 700 nm that photosynthetic organisms are able to use in the process of photosynthesis. (Think "ROY G. BIV" from your grade-school science class.) The charts in this article show the intensity of each color wavelength as well as the total range of spectrum that each bulb emits.

## Light Strength

Micromoles per square meter per second ( $\mu\text{mol}/\text{m}^2/\text{s}$ ) is the most common unit used for measuring PAR. This unit quantifies the number of photons (discussed below) that fall within a 1-square-meter area every second.

PAR can also be expressed in energy units for irradiance, in watts per square meter ( $\text{w}/\text{m}^2$ ) or watts per square centimeter ( $\text{w}/\text{cm}^2$ ). This is relevant in energy-balance considerations for photosynthetic organisms and for varying surfaces such as those of leaves. Similar units of measurement also include photosynthetic photon flux (PPF) or photosynthetic photon-flux density (PPFD), which are quantum measurements that relate precisely to the units of photon measurement such as micromoles or microEinsteins (E).

As a point of comparison to better understand Table 1.1, the sun can deliver up to 2,000  $\mu\text{mol}/\text{m}^2/\text{s}$  of PAR at noon on a sunny summer day in California at the earth's surface.

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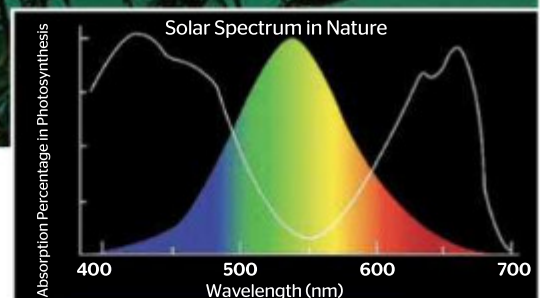
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Once the LED revolution started, there's been no slowing it.



Figure 1.2

“In fact, blues are the color wavelengths with the most light energy. This makes the blue spectrum an excellent supplement to HID lighting. However, don't mistake this to mean that plants need only blue wavelengths, or even that they need them more than the rest.”



Test Results (Figure 1.1)

Lamp Type	PAR Value* ( $\mu\text{mol}/\text{m}^2/\text{s}$ )	Total Irradiance ( $\text{w}/\text{cm}^2$ )	Visible Spectrum ( $\text{w}/\text{m}^2$ )	UVA/ UVB Spectrum ( $\text{w}/\text{cm}^2$ )	Total Luminance (lux)
Gavita Pro HPS 1000e DE US (1,150w)	798.68	23,371.9	184.65	43.74	36,197.9
American Green Truth LED (1,200w)	781.72	17,882.9	178.83	0	27,031.8
BLI Ceramic Lamp (315w)	686.05	16,501.9	153.23	102.70 (UVA)	37,388.1
Genesis HPS DE 30 (1,150w)	549.49	15,569.4	121.17	42.19 (UVA)	31,227.7
Solar Storm 440 LED (350w)	381.68 (Bloom) 248.79 (Veg)	7,485.64/ 5,132.76	74.86/ 51.32	22.58 (UVB)	5,316.0/ 4,451.78
Chameleon Plasma Lamp (500w)	324.89**	7,709.74	76.34	84.49 (UVA)	20,779.3
Marigold Induction Lamp (400w)	81.49	1,699.59	16.87	3.81 (UVA)	2,615.99
Econolux T5HO eight-bulb fluorescent (432w)	87.17	1,822.89	18.14	8.68 (UVA)	3,194.44

\*Editor's note: These PAR measurements were taken at a 2-foot distance from the light source. It's important to note that advanced growers who are better able to control the garden's atmospheric conditions (such as temperature) should be able to keep their garden canopy closer to the lamps, somewhere between 12 to 18 inches. Moving plants closer to the light source (as well as the spectro-radiometer used to take these measurements) will result in higher PAR values that may be more in line with the manufacturers' labels. For more information, look up the "inverse-square law."

\*\*Please see the following product notes for more on this lamp's PAR values.

Photobiology

Simply put, photobiology is the scientific study of the interactions between living organisms and light. For our purposes, it is specifically the study of the interactions between plants and light—which brings us directly to the process of photosynthesis.

Plants use light as the primary energy supplier and catalyst in the chemical reaction that creates food for them. Plant growth is driven by photosynthesis, the process that converts water, carbon dioxide and energy from light into carbohydrates, which are the essential building blocks for plant nutrition and growth. These carbohydrates take the form of glucose, or sugars, that are the real foods used by plants for energy, growth and development.

An equation for this reaction looks like this:  
 $n \text{CO}_2 + n \text{H}_2\text{O} + \text{photons} \rightarrow (\text{CH}_2\text{O})_n + n \text{O}_2$   
 Or, more simply:  
 Carbon dioxide + water + light energy  $\rightarrow$  carbohydrates + oxygen.



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Traditional HPS lamps are still a predominant force in commercial grows.

## The Photons FAQ

If the different forms of light contain photons in different quantities and qualities, does this mean some color wavelengths have more energy?

Yes. Because photon energy is inversely proportional to wavelength, the energy is frequency-dependent. Consider the following:

- The energy content of a photon is directly proportional to the light's frequency.
- As frequency decreases, wavelength increases.
- Thus, as frequency decreases, so does light energy.
- Therefore, reds are longer and have less energy. Blues are shorter and have more energy.
- In fact, blues are the frequency/wavelength with the most light energy. This makes the blue spectrum an excellent supplement to HID lighting. However, don't mistake this to mean that plants need only blue wavelengths, or even that they need them more than the rest.
- Blue and red may be the wavelengths best absorbed by plants, but they are also less present in the sun's natural light, which is why plants have become more efficient at absorbing them (see Figure 1.2). Still, the fuller the spectrum, the better that light will be overall for the plant's photosynthetic processes.

Because plants have evolved using the sun's natural spectrum for millions of years, the sun serves as our best gauge for what type of light plants need most. This means that the broader the spectrum—or the closer to that of the sun—the better that light will be for plant growth and development.

Sunlight contains only 44 percent visible light (or PAR); the rest is made up of 52 percent infrared light and 4 percent ultraviolet light. In theory, plants could use the ultraviolet or infrared sections of the spectrum for photosynthesis, but they do not. So why is it that plants use only visible light as a source of energy for photosynthesis?

The answer comes down to one very small and complex particle known as the photon. These are the particles that plant pigments, such as chlorophyll a and b, harvest from light to supply the energy needed in photosynthesis.

A single photon carries a certain amount of energy depending on the wavelength. A quantum refers to the amount of energy carried by the photon. Quantum meters, such as the spectro-radiometer used in these tests, approximate the quantity of photons between 350 and 750 nm. Photosynthesis is largely driven by the number—and quality—of photons between these two wavelengths.

The following provides a breakdown of the sun's natural spectrum and how the various forms of light radiation are used (or not used) by plants during photosynthesis:

**Ultraviolet light:** Each photon of ultraviolet light contains too much radiation for most biological systems. Its high energy will drive electrons from molecules and break their weak bonds. The ozone layer of our atmosphere protects all life on the planet from high levels of ultraviolet radiation.

**Infrared light:** Each photon of infrared light doesn't have enough energy to do useful work in a biological system. Cells do absorb this radiation, but it contains insufficient energy to drive metabolic reactions and gets converted to heat. Infrared radiation is absorbed by water and by carbon dioxide in the atmosphere.

**Visible light:** Each photon of visible light contains just enough energy to excite the electrons of molecules without causing damage to the cell. Visible light, or PAR, is the miracle light needed in photosynthesis. Limiting this spectrum to only a few of its wavelengths is unnatural and potentially harmful for a plant's development.



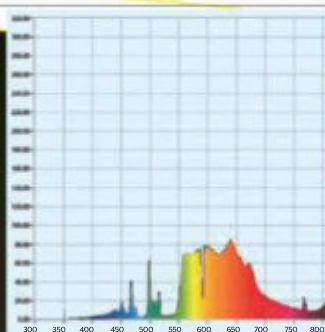
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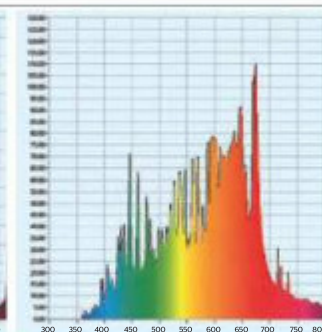
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Gavita's Pro 1000e digital HPS system, complete with new reflector, tops our trial charts.

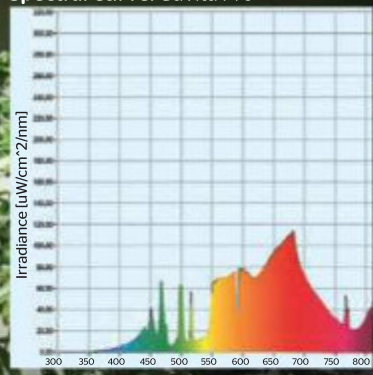


Genesis DE 30



BLI Ceramic Lamp

Spectral Curve: Gavita Pro



## The Lamps: Expanded Notes

### Digital HPS Systems

HPS, or high-pressure sodium, bulbs are one of the most popular HID (high-intensity discharge) lamps in use today. Heavier in the orange-to-red wavelengths, HPS bulbs provide excellent spectrum for the flowering phase of cannabis plants. The systems noted below are digital HPS systems, meaning their bulbs are specifically constructed for electronic and digital ballasts. While most HID bulbs will work in these types of ballasts, compatibility issues exist as they are not engineered to operate at the high frequencies electronic and digital ballast utilize. Non-digital HPS bulbs used in these ballasts will have a much shorter life cycle than those manufactured for electronic or digital ballasts. Gavita Pro 1000e DE US

If you're looking for a "winner" in our lamp trials, look no further than Gavita's premier digital HPS Pro system. It's available in both a 240-volt and 120-volt version, which means that both the European and North American markets can take advantage of this exceptional lamp. The double-ended bulb technology allows for a true-burning, long-lasting bulb whose life won't be cut short by the incompatibility issues that plague the majority of HID bulbs on the market today, which cannot withstand the high hertz counts created by the new electronic and digital ballasts.

The 1,000-watt bulb—now manufactured solely by Gavita after Philips bolted from the horticultural cannabis market—fits in two specialized sockets that attach to the included ballast for an all-in-one system. The ballast itself offers five different settings: 600, 750, 825, 1,000 and 1,150 watts. The data shown



The Genesis digital HPS DE 30 series, with the Ushio double-ended bulb.



Boulder Lamp's ceramic discharge lamp is one of the best horti-lights available today.

here were produced at the 1,150-watt setting, at a 2-foot distance from the bulb, while utilizing the new, highly effective Gavita reflector being sold with the 2015 units. With this new reflector, the coverage stretches just past a 4' x 4' area. The one downside to this system is that it does create a bit of heat, so it's recommended that those with smaller gardens—or without adequate atmospheric controls—purchase the Gavita units that come with remote ballasts, thereby eliminating some of the heat buildup in the growroom.

### Genesis DE 30

After the initial partnership between Gavita and Philips a few years back that produced these digital HPS wonders, a few other smart lighting companies caught on to the technology and formulated their own versions. Of these, one of the more economical units comes in the form of the Genesis DE 30.

Utilizing a Ushio Pro Plus double-ended bulb, the Genny DE 30 produced a spectral curve that was very close to the Gavita in range, but fell short in its PAR rating (see Table 1.1). The unit also features dimmable positions at 600, 750, 1,000 and 1,150 watts. If there's one drawback to this lamp, it's the reflector hood, which could be improved to increase both canopy penetration and the coverage area, which currently stands at just over 3' x 3'. Still, this is a very good lamp as well as a great value for budget-minded consumers.

### Ceramic Bulbs

Referred to mainly as ceramic discharge lamps (CDLs), ceramic bulbs are a relatively new source of light that represent a variation on MH bulbs, which are themselves a variation on the older mercury-vapor bulbs. The discharge is contained in a ceramic tube usually made of sintered alumina (aluminum oxide), similar to what has traditionally been used in HPS bulbs. CDLs create plasma light, the same as the sun and other HID lamps.

### SunBrightCDL Agro Grow Light

Perhaps the most pleasant surprise in the entire field came from the CDL manufacturer Boulder Lamp Inc., who absolutely crushed it in our lighting trials. Utilizing a 315-watt Philips Ceramic Agro Bulb, the SunBrightCDL provided extremely broad and intense spectrum across the board.

The spectral curve of this CDL was one of the fullest in the group. And with over 60 percent of its light energy being generated around the blue and red spectrums, it hit the right spots in terms of a plant's natural absorption curve (see Figure 1.2). Its PAR value, at 686  $\mu\text{mol}/\text{m}^2/\text{s}$ , was almost unbelievable for such a low-wattage bulb. Although manufactured in Colorado, these lamps require 208 to 240 line voltage. The units come preassembled with an electronic ballast attached to the top of the reflector hood, with dimming as an available option.



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## LED Systems

An LED, or light-emitting diode, is a two-lead semiconductor light source. When a specific voltage is applied to the leads, electrons are able to recombine with “electron holes” within the device, releasing light in the form of photon energy. This light is not plasma light, but it is electroluminescence. The color of the light (corresponding to the energy of the photon) is determined by the energy-band gap, or electron hole, of the semiconductor. Diodes are also monodirectional in their functioning, emitting light in only one direction.



### American Green Truth M16 LED Lamp

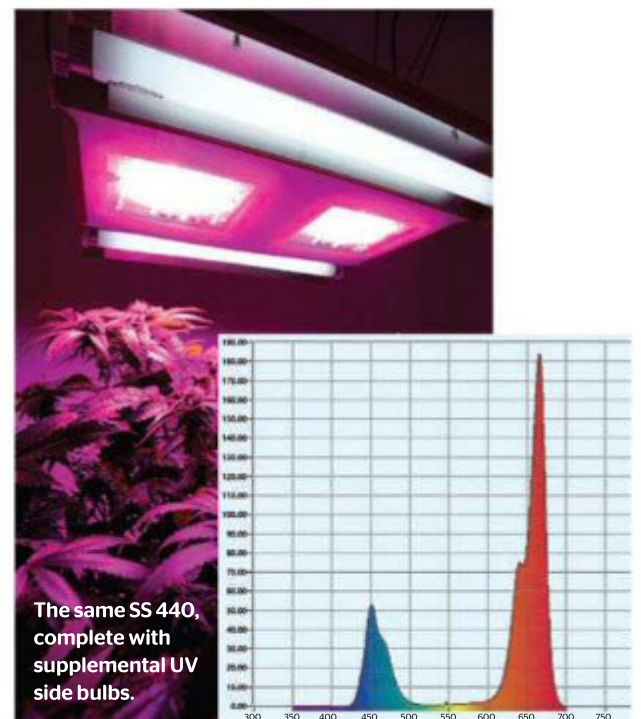
Admittedly, this author has not been the biggest supporter of LED lamps in the past. However, we always knew that sooner or later the technology would become less expensive and that eventually LEDs would begin to catch up to our beloved HID bulbs. As is evidenced by our cover photo, we’ve finally found one that sets a new standard for LED lighting.

This strong M16 LED lamp, designed by Truth Lighting (and recently acquired by AG), came in second on the list of PAR ratings, testing very high at 781.71  $\mu\text{mol}/\text{m}^2/\text{s}'$ . With 144 5-watt diodes mixing red, blue and white, this isn’t surprising. The M16 performed well in terms of spectrum, displaying the typical—but much broader—spikes in the blue (450 nm) and red (625 to 675 nm). The blue wavelengths, which are the frequencies carrying the highest amounts of usable photon energy, were especially potent on the M16, likely contributing

heavily to its high PAR value.

However, its price tag (\$1,350) and energy consumption (a 760-watt actual power draw) detracts from some of the competitive

market advantages usually associated with LEDs. Still, the M16 can be recommended as one of the few stand-alone LED lamps on the market for your flowering room.



### California Lightworks Solar Storm 440

The other LED lamp that we tested, the Solar Storm 440 from California Light Works, was an intriguing product that was scalable on both the red and blue wavelengths for various phases of growth. It also included a UVB bulb (281 to 320 nm) on each side of the lamp for added punch during flowering.

The SS440 uses only red and blue diodes and can’t be described as a full-spectrum lamp, though it does offer switches for both “Veg” and “Bloom” spectrum, as well as an on/off switch for the UVB bulbs. Still, with a maximum PAR value of 381.68  $\mu\text{mol}/\text{m}^2/\text{s}'$  and a two-tone spectrum, this is an ideal high-end supplemental lamp that can help boost light energy and plant production. The manufacturer-suggested retail price on this unit is \$1,049, though it can be found for as low as \$899 on various websites.

Solar Storm 440

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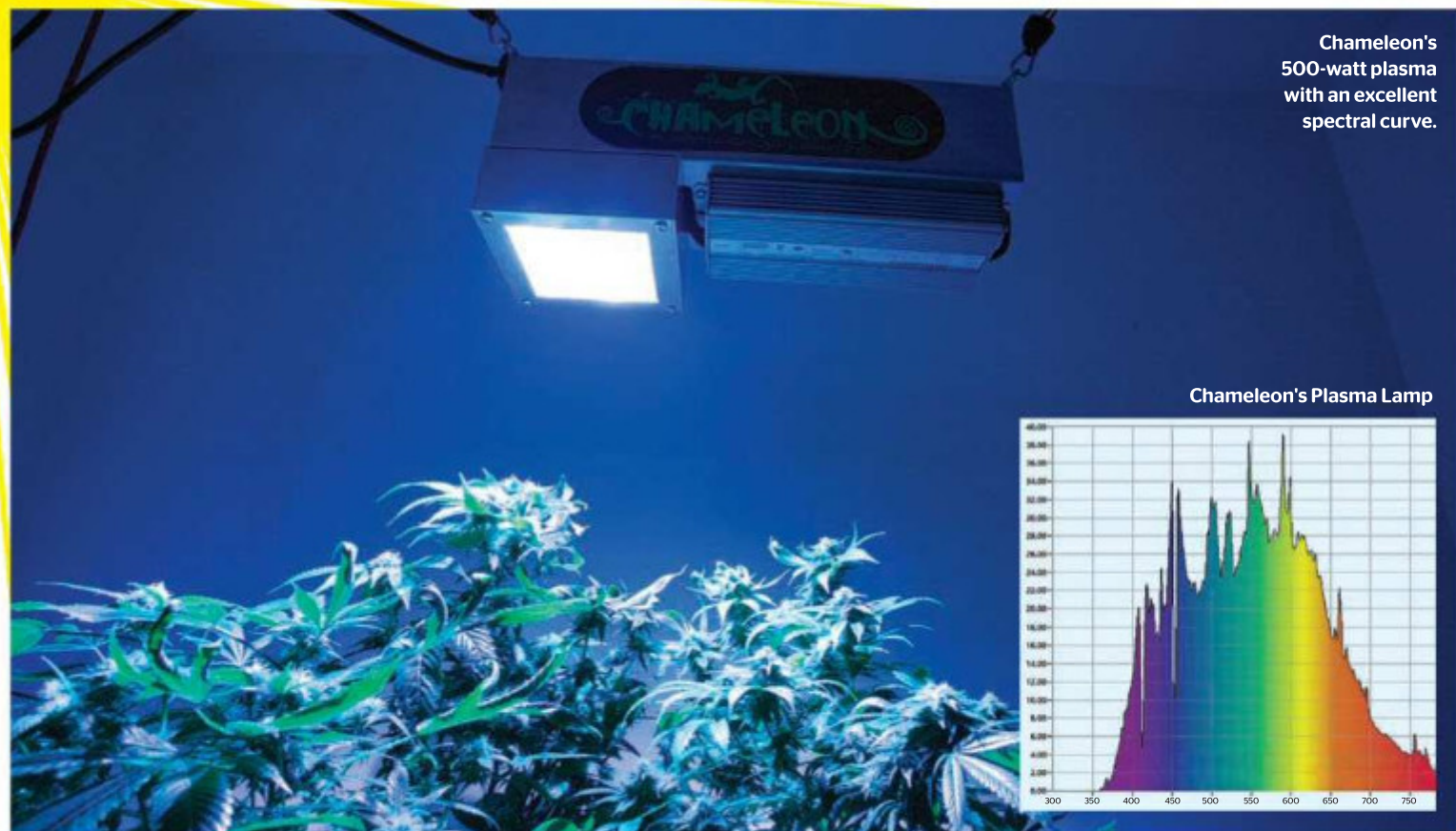
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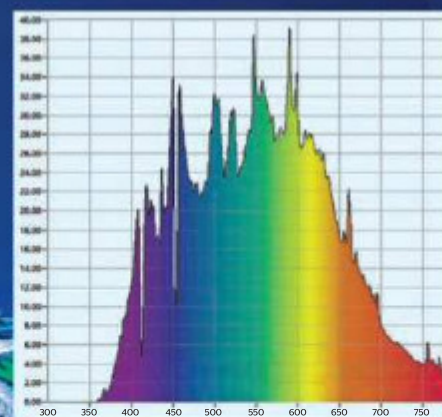
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Chameleon's 500-watt plasma with an excellent spectral curve.

Chameleon's Plasma Lamp



## Plasma Lamps

Plasma lamps are a type of gas-discharge lamp not dissimilar to HID bulbs. However, instead of using electricity to excite the gases into illumination, plasma lamps utilize radio-frequency power. These internal-electrode-less lamps were originally invented by Nikola Tesla and often feature bulbs that are only an inch or two in size.

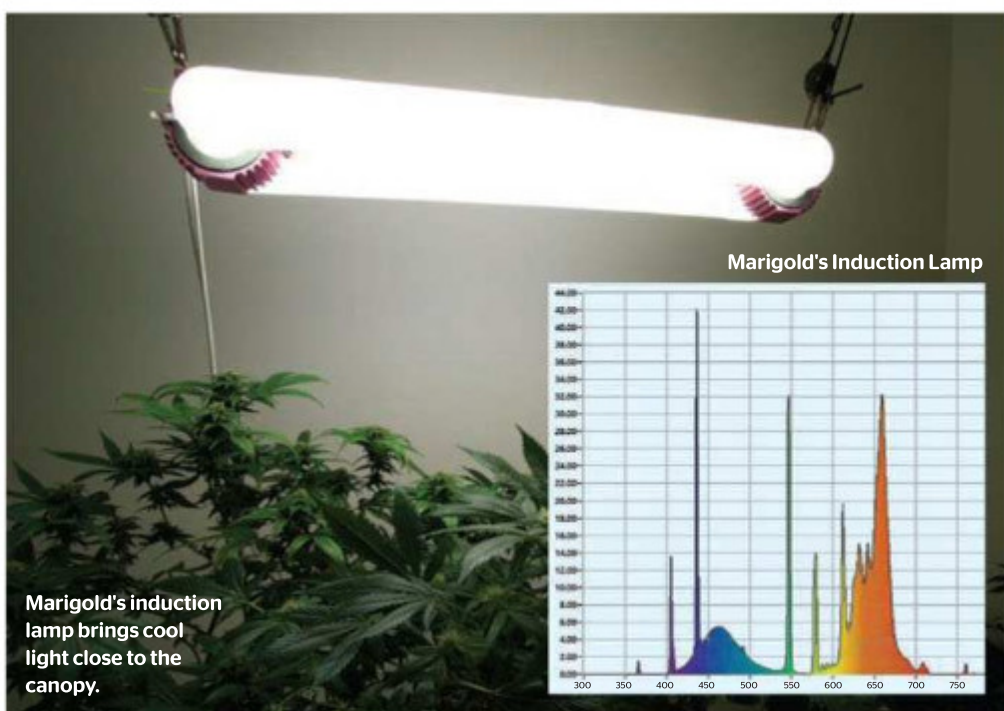
### Chameleon Plasma Grow Light

The PAR values listed in the test results in this article (Table 1.1) can be a bit misleading. This is because they represent tests conducted at a 2-foot distance from the light source. However, this plasma grow lamp from Chameleon actually possessed an extremely low heat signature, thereby allowing growers to place the lamp even closer to the plants than usual. At a 1-foot interval, the PAR value more than doubles - increasing to a whopping 845.60  $\mu\text{mol}/\text{m}^2/\text{s}$ . However, Chameleon recommends a distance of 18-inches off the canopy, which will supply 600  $\mu\text{mol}/\text{m}^2/\text{s}$  and keep a minimum coverage area of 3' x 3'.

That being said, this plasma lamp also boasted one of the better overall spectrums in these trials. However, these lamps do leave a little bit to be desired in red wavelengths as their intensity falls off around the 650nm mark, producing a blue-ish hue over the plants. As technology progresses, and more red is added to the spectrum, these lamps are becoming more and more a two-stage lamps for both veg and flower. In fact, Chameleon now offers the addition of red LED "sidecars", which bring a significant amount of red spectrum that can take your plants to full-term.

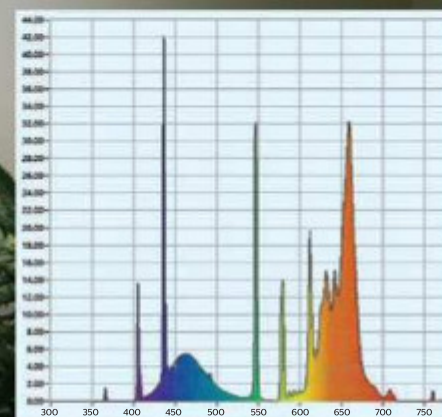
## Induction Lamps

Also similar to both HID and plasma lamps, the induction lamp is another gas-discharge bulb, though it uses neither electricity nor radio frequency to illuminate its gases; instead, it utilizes an electric (or magnetic) field to fire up the bulb.



Marigold's induction lamp brings cool light close to the canopy.

Marigold's Induction Lamp



### Marigold Lighting Induction Lamp

As was also the case with plasma lamps, induction lamps ran into a rating problem in our standardized tests, one that involved the plant's proximity to the light source. This induction lamp from Marigold Lighting runs very cool, allowing growers to move it much closer to the garden canopy, thereby increasing the PAR value.

This particular lamp also uses a highly specialized, proprietary blend of phosphors that correspond more closely with the absorption curve of cannabis plants during photosynthesis (see Figure 1.2). Looking at its spectral curve, we see that it has color spikes throughout, with good intensity for the red wavelengths. Keeping these induction lamps from 6 to 12 inches above the plants will result in better yields to match the healthy, well-developed plants they produce.



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# Fluorescent Lamps

The original in energy-efficient grow lighting, fluorescent lamps offer some of the best spectrum out there. They also run cool to the touch and can be placed just inches above garden canopies. The downside is usually their intensity, though in recent years larger fixtures have been taking aim at that issue.

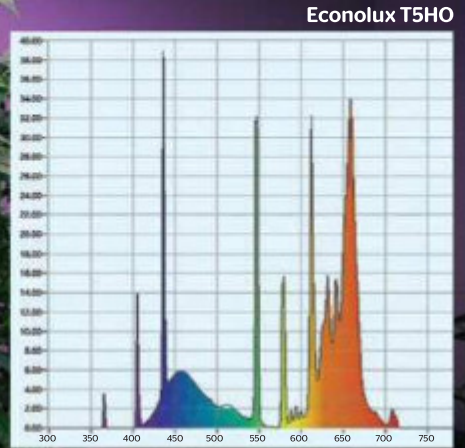


Fluorescents are no longer for beginners! Super efficient and economical, these T5s are highly specialized, allowing growers to create custom spectrum.

## Marigold Lighting Econolux T5HO Fluorescent

The eight-bulb T5HO fluorescent fixture from Marigold is another step in the right direction: It offers four different bulb types, including a higher red, higher blue and UV (both A and B) so that growers can create a more customized spectrum for the various stages of plant development.

These lamps are relatively inexpensive and, when used properly, can easily replace a 400-watt HID lamp. Still, many growers tend to slide these units into nurseries, which is always a great option—but an even better idea is to use them in conjunction with HID lamps for healthier and happier plants. Their cost-effectiveness and lower price tags make them an attractive option for growers looking to boost quality without sacrificing their budget—or the environment. 🌱



Apache Tech LED introduces the first **True 1000 Watt Replacement!**

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# KIND LED GROW LIGHTS



WINNER  
GEAR OF THE YEAR  
**2014**

*K5 Series*  
**"BEST GROW LIGHT"**  
KINDEST YIELDS

WINNER  
GEAR OF THE YEAR  
**2015**

PERFECT MIX OF 3 & 5 WATT DIODES INCREASES OVERALL EFFICIENCY AND INTENSITY, RESULTING IN HUGE YIELDS

## KINDEST ADJUSTABLE SPECTRUM

FULL SPECTRUM CONTROL: ALLOWS DIGITAL TUNING OF SPECTRUM TO MATCH PLANT TYPE AT ANY STAGE OF GROWTH, VEG OR FLOWER!

## KINDEST FOOTPRINT

LARGEST FOOTPRINT OF ANY LED IN THE INDUSTRY, NOW MATCHING THAT OF IT'S HPS COUNTERPART

## KINDEST INTENSITY

SECONDARY OPTICAL LENS MAGNIFIES PAR AND INCREASES CANOPY PENETRATION BY UP TO 200%



### XL750



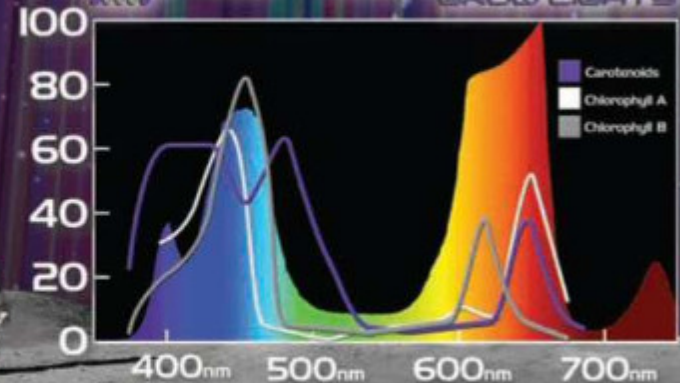
Dimensions: 23"x17"x3.5"  
Weight: 28lbs  
Actual Wattage: 450w, 120-240v  
HID Wattage Equivalent: 750w  
Total Diodes: 208  
Footprint: 4'x4'  
Infrared/Ultraviolet Diodes: Yes

### XL1000



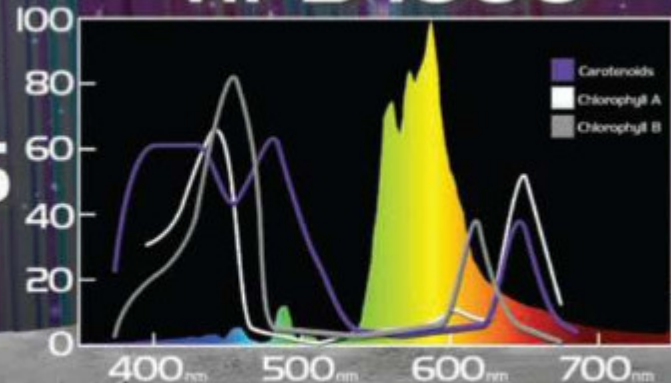
Dimensions: 26"x20"x3.5"  
Weight: 36lbs  
Actual Wattage: 650w, 120-240v  
HID Wattage Equivalent: 1000w  
Total Diodes: 320  
Footprint: 5'x5'  
Infrared/Ultraviolet Diodes: Yes

## KIND LED GROW LIGHTS



KIND LED PERFECT 12 BAND SPECTRUM

## HPS 1000



VS

# 2015 S.T.A.S.H. AWARDS

## OUR PICKS FOR GEAR OF THE YEAR

Each year, the High Times Cultivation Department scours the earth in search of the best pot-growing products to highlight in our annual Significant Technological Achievements in Secretive Horticulture (S.T.A.S.H.) Awards.

### Best pH Regulator:

**AHS-1 Automated pH Doser and H<sub>2</sub>O Tank Filler**

AHS-1: \$1,850,

AHS-Rez: \$250

[automated-hydroponics-solutions.com](http://automated-hydroponics-solutions.com)

If you still spend too much time measuring and adjusting the pH whenever you refill the reservoir on your hydro growbox, why not automate that work as well? This tank takes care of water from start to finish: It adjusts the pH, provides continuous oxygen, and refills your reservoir automatically whenever it gets low. Spare yourself the hassle and give yourself some extra vacation time with the AHS-1!



**Best Growbox Package:****BC Northern Lights****Motherload Combo**

\$6,250

[bcnorthernlights.com](http://bcnorthernlights.com)

Want to grow over seven pounds of pot per year? If so, then the BC Northern Lights Motherload Combo is the perfect tool for the job. The system comes with everything you'll need, including two high-quality growboxes—one for clones, another for veg and flowering—as well as a drying box. The units are built in Canada using industrial-grade parts and medical-grade aluminum, and everything is automated with touchscreen technology, including odor control and CO<sub>2</sub> dosing, for successful harvests every time. As an added bonus, grow consultants are available for support seven days a week.

**Best Grow System:****The SuperFlower 3.0**

\$1,995

[supercloset.com](http://supercloset.com)

For those looking for a fully automated turnkey system without the hassles of planning or building, the options available from Supercloset are among the finest anywhere. Their customizable growroom kits feature Phresh filters, Hurricane inline fans, Gorilla Grow Tents, TechnaFlora nutrients and Kind LED lighting. Their SuperPonic hydro systems combine several technologies for faster, superior growth. They also provide an instructional DVD and lifetime customer support.

**Best Micro-Grow Cabinet:****Medicab Micro from Cabinet Grow**

\$979, plus \$135 shipping

[cabinetgrow.com](http://cabinetgrow.com)

When you don't have much space to grow, it's important to maximize every inch. The Medicab Micro, at only 23.5" x 25.5" x 18", can produce more than enough cannabis for patients working with a limited area. The lighting is a combination of LEDs and compact fluorescents to reduce heat, and the odor-controlled venting keeps your secret safe. With a 90-day money-back guarantee, three-year warranty and lifetime grow support, you'll be dealer-free in no time. Use promo code HT4:20 for 10% off any cabinet.

**Best Growbox:****The God Father**

\$4,399.90

[hydroponicsgroup.com](http://hydroponicsgroup.com)

Automated growboxes eliminate much of the guesswork from cultivating your own pot. At 6.5' tall x 6.3' wide x 47" deep, the God Father provides 170 cubic feet of growing space, powered by two air-cooled 600-watt high-pressure sodium or metal-halide lights (with LED options). All suspicious smells are completely eliminated by a pair of quiet Raptor odor controllers with charcoal filtration. The God Father also comes with all the nutrients and pumps you need, plus a three-year warranty.



# ULTRA TRIMMER

**Food grade stainless steel stationary guards**  
**Slots are tapered to gauge the size of your bud**  
**Cola cutter 1/2" diameter runs your branch through in seconds**  
**Reversible from concave to convex**  
**Aircraft Aluminum Frame for strength and lightweight mobility**  
**Adjustable speed controller with heavy duty motor**



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INDUSTRY ASSOCIATION



**Tumbling bud in round cylindrical devices destroys trichomes. Trimming wet bud with fast spinning fan blades is just plain stupid. Your product should hang and cure for at least 10 to 14 days in a dark, cool, dry and well ventilated area. The way it's been done for thousands of years. [Fans help in this day and age]**

**Scissors used to be the only way to trim dry bud with out destroying trichomes. It is very time consuming. Ergo a true set of mechanical scissors for dry bud, but better - scissors don't cut when they spring back. Ultra Trimmer cuts both ways and doesn't stop until you turn it off.**

**With its slow moving parts [NO VIBRATION] it simply snips the bud, [ADJUSTABLE SPEED] at 232 snips per revolution and many buds at a time. Once the bud has been snipped it will not snip any more bud material until the bud is moved. The Ultra Trimmer can trim 4 ounces in 5 minutes - without destroying trichomes! We make larger devices as well. These larger devices are custom made to order and can handle processing 12-18 lbs per HOUR!**

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**Best LED Lighting:**

**Kind LED K5 Series**

XL750, \$1,295; XL1000, \$1,695  
 supercloset.com

Light-emitting diode technology has come a long way as prices decrease and innovations flourish—and Kind LED is leading the way with the excellent design and craftsmanship of their new K5 Series. With an adjustable spectrum and larger footprint, these lights don't lack in intensity for better canopy penetration, while still using less electricity and creating less heat than high-intensity discharge lights. Kind LED's proprietary 12-band spectrum, including both infrared and ultra-violet diodes, increases yields and essential-oil production.

**Best Vacuum Oven:**

**Across International Elite Series**

Starting at \$2,990  
 acrossinternational.com

Across International went back to the drawing board to build a better vacuum oven from the ground up. The newly redesigned Elite Series offers superb temperature uniformity—at just 3% variation, you'd be hard-pressed to find a thermometer that could detect any difference—along with a solid vacuum oven and cold trap to consistently generate the best product your starting material allows.



**Best Light Mover:**

**West Coast Growers Sturdy-Built Rotator**

Starting at \$527.95  
 westcoastgrowers.com

You can expand your grow lights' footprint substantially using light movers, but some seem to cause more problems than they solve. Not so with this Sturdy-Built spinner, a uniquely designed unit that can rotate as many as eight lights at a time. The metal housing and steel arms complement the high-stress bearings and strong motor for durability and peace of mind. Best of all, you don't have to cut cords or do any hard wiring—simply hang it up and grow.

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**2015 "BEST OVERALL SYSTEMS"**

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**Three Year Warranty**  
 for your entire SuperCloset

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**Fully Automated**  
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**Kind LED GROW LIGHTS**

**WINNER 2014** **WINNER 2015**

This revolutionary series of LED grow lights will produce the biggest and best yields, while consuming approximately half the electricity and producing virtually no heat.

**T5 Side Lights**  
 The perfect cool spectrum supplement to your overhead KIND LED GROW light.

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**Best Trimmer: The Ultra Trimmer**  
Starting at \$4,500, plus \$250 shipping. Pictured above: The Collective.  
[ultratrimmer.com](http://ultratrimmer.com)

Not your average automatic trimmer, this heavy-duty device delivers a product that rivals even connoisseur-trimmed bud. Standard rotary trimmers treat buds to a bumpy ride, and a lot of those precious trichomes and resins end up stuck between the moving blades. The Ultra Trimmer moves slowly and gently enough to keep buds intact, trimming them to perfection. The trim falls through the moving blades onto a 160-mesh screen, making good dry-sift hash with every fallen trichome. Say goodbye to long hours of trimming—without suffering a loss in yield!

**Best Concentrate Extractors:**  
**Tamisiu Extractors**

Prices vary  
[tamisiuextractors.com](http://tamisiuextractors.com)

Tamisiu Extractors offers one of the safest, simplest and most readily customizable closed-loop extraction systems on the market. By eliminating the use of dangerous vacuum pumps, this extraction lab slashes the risk of freak



accidents, and its specially designed tanks won't let sparks form when the extractor is sealed. The larger-scale systems allow for full automation, and you can get real-time data sent to your smartphone, so you always know if the system is doing its job.

**Best Dry Nutrients:**

**Green House Powder Feeding**  
Prices vary  
[powderfeeding.ch](http://powderfeeding.ch) or [rambridge.com](http://rambridge.com)

Purchasing dry nutrients saves money, lowers your carbon footprint (by not shipping water), and allows you to store your plant foods longer. Green House Seed Company has developed a superlative line of Powder Feeding formulas, and they're finally available in the United States and Canada! The vegetative formula is called Grow; for flowering, Green House has separated the categories into short-flowering, long-flowering and hybrids, along with various additives.



And with a comprehensive nutrient schedule available online, it's easy to dial in your feeding regimen.

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**Best Grow System!**  
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Award Winning Super BubbleFlow Buckets grow your plants 2-3x faster and easier! Guaranteed!

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**KINDLED LED**  
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Gorilla Grow Tents come with an Industrial Strength Spill Tray and a IR Block roof keeping you safe on both ends! Grow with Confidence!

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**Best Liquid Nutrients:**

**Advanced Nutrients  
Coco Bigger Buds Tribe**

*Prices vary*

[advancednutrients.com](http://advancednutrients.com)

Growing with coco coir makes hydro more forgiving: The medium retains water and nutrients like a sponge, while

providing plenty of aeration for healthy roots. If you're not careful, though, you'll run into problems with nutrient lock-ups and pH imbalances, which is why the Bigger Buds Tribe from Advanced Nutrients is the perfect solution: the only nutes on the market scientifically crafted for growing cannabis in coco.

**Best Potting Soil:**

**Roots Organics Original**

*Prices vary*

[aurorainnovations.com](http://aurorainnovations.com)

Soil-based growers know that the lighter and airier the soil mix, the bigger and faster their plants' roots will grow. We love the all-purpose coco-based potting soil from Roots Organics, which is ready to use indoors or out. The quick-draining mix contains peat, pumice and perlite along with worm castings, bat guano and other beneficial additives—all in a handy camo bag that you can grow in as well. ✨

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# THE GREEN ZONE

A veteran of Afghanistan relives the terror and tedium that characterized his tour—and reveals how the local cannabis eased the stress of combat for his band of brothers.

Story and photos by Jack Porter

**A** thunderous boom broke my consciousness apart in a thousand puzzle pieces. When they assembled themselves back into place, the scene in front of me was absolute chaos.

Our MRAP had been hit with our first IED. MRAP is the acronym for “mine-resistant armor-protected vehicle.” It’s the tank-like vehicle that replaced the Hummer, better equipped to withstand the blast of improvised explosive devices.

Despite the ringing in my ears, I could hear someone screaming somewhere on the other side of the black cloud of explosive dust that filled our truck. I couldn’t see, and the parts of my mind that knew who was screaming and what to do weren’t responding.

Finally, my mind kicked into gear. I was able to remember the name that belonged to the voice, and muscle memory began to take over as I wrestled my way out of the seatbelt and frantically rendered first aid.

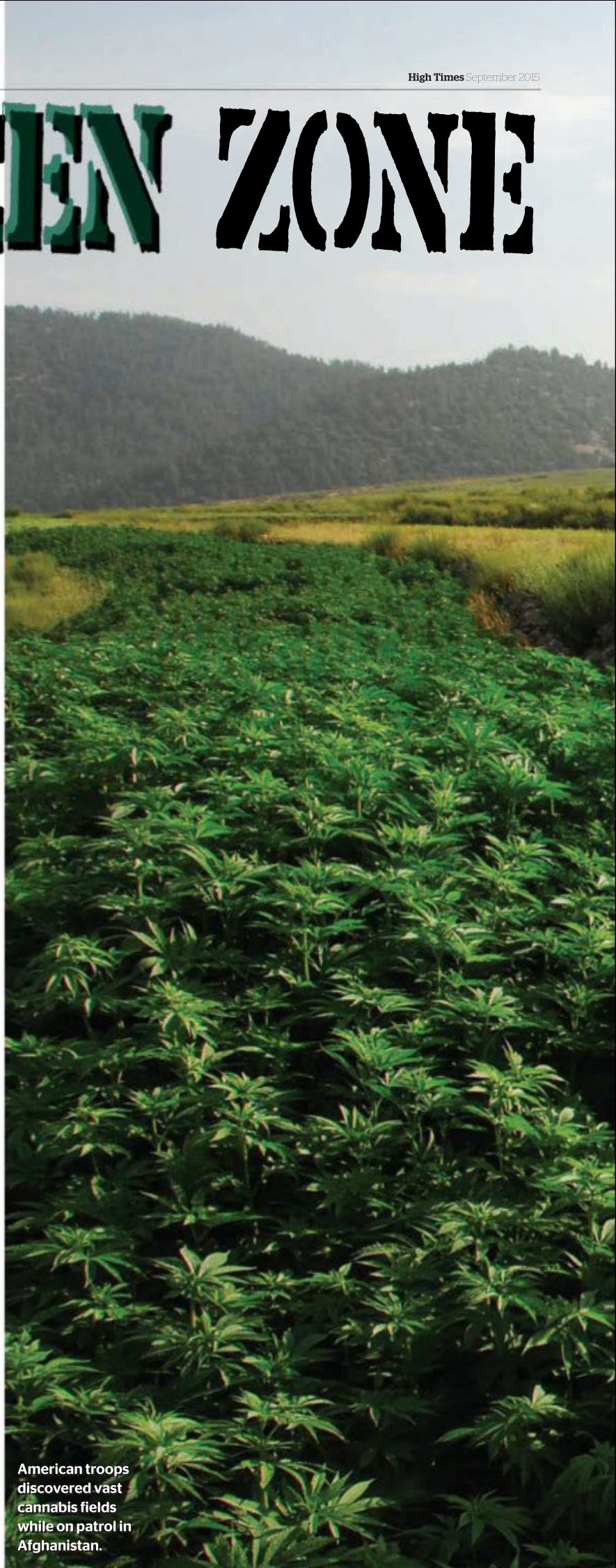
My squad leader climbed into the back of the MRAP with me, and we worked together to help the wounded soldier. Fists were pounding on the outside of the backdoor, and voices shouting for us to open up. The explosion had bent the doorframe so that it couldn’t open. As other soldiers desperately pulled

on the door from the outside, our wounded soldier began to gasp for air. His lung was collapsing, having been ruptured from the force of the blast.

All at once, our luck changed: Our medic found a way through the front of the vehicle and took over stabilizing the soldier. A combined effort from inside and outside the truck managed to pry open the backdoor. Daylight flooded in, and the hands of friends—our fellow soldiers—pulled us out; they shared our joy at finding us all still alive.

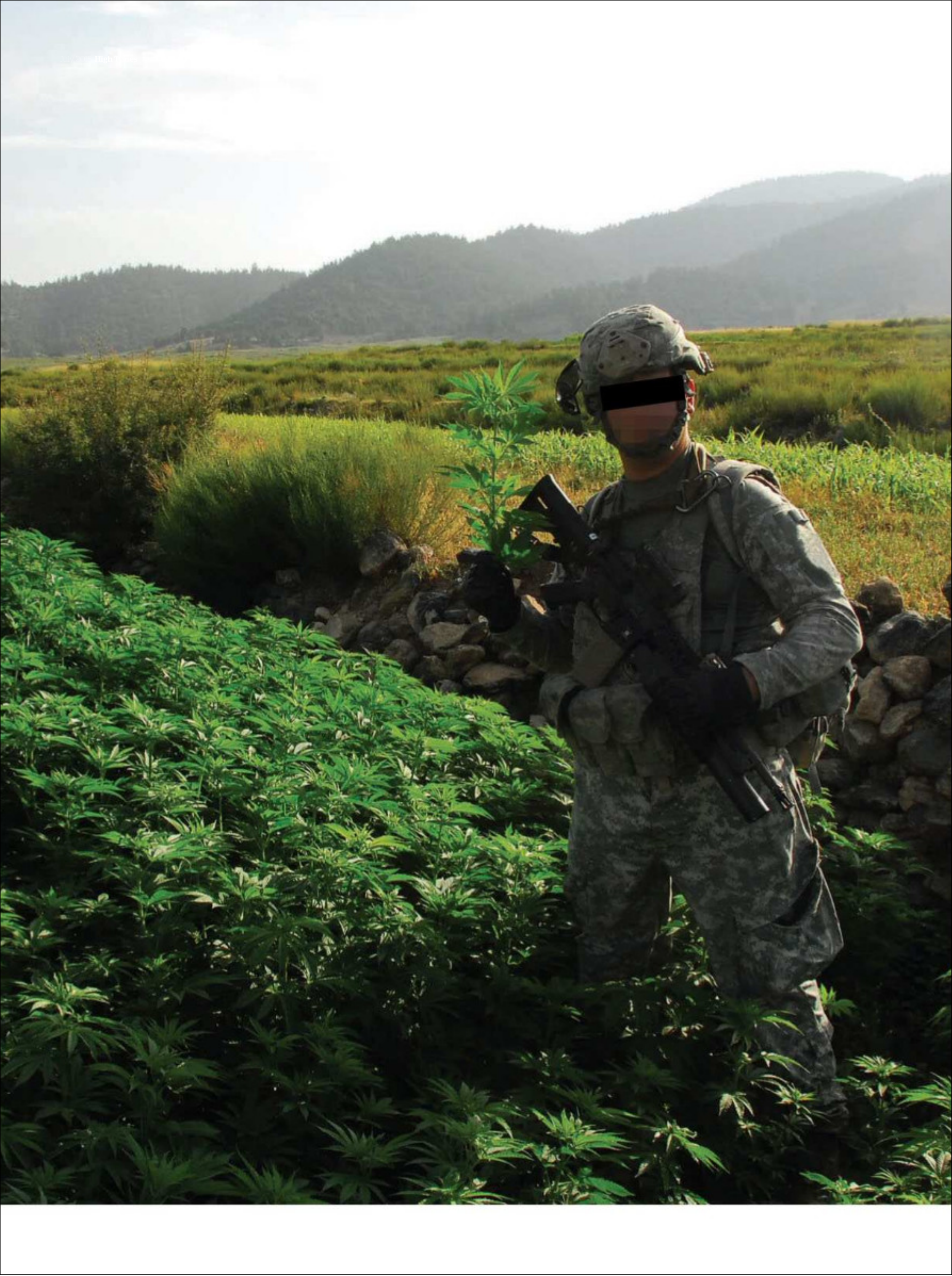
Within minutes, a helicopter swooped onto the scene and airlifted our wounded soldier away to the doctors who would save his life. For the rest of that day, we searched for Taliban in the area and then waited for a recovery crew to arrive and tow the blasted MRAP. At some point, one of my sergeants looked me over and recommended that I go sit in another vehicle and take it easy.

I found a seat and laid my rifle across my lap. Then I reached into my cargo pocket and pulled out a small bag of what looked like chewed-up grass clippings stuck together with spit—*naswar*. I tucked a pea-sized nugget inside my cheek and immediately felt the massive tension that had taken over my consciousness slip away. A peaceful feeling spread through my body, and I did, in fact, relax.



American troops discovered vast cannabis fields while on patrol in Afghanistan.







As a goof, some soldiers affixed leaves to their helmets for camouflage.

**T**here would be many more days and moments like these during my combat tour in Afghanistan's Paktia Province, and for quite a few of us, "relaxing" would become synonymous with alcohol and, often, with the pot that grew right outside our base, with the hash that could be bought from our day laborers, or with a foul-tasting local dip called *naswar*.

Coming into the country had taken us months. In preparation, our unit had been bounced around the US for training, getting inoculated and filling out forms to feed the Army bureaucracy. After our plane touched down at Bagram Airfield in Afghanistan's Parwan Province, our first night was dark and confusing. We were shuttled from building to building getting briefed, moving equipment and being fed.

On my first morning in-country, I woke up and walked out of the circus tent where we'd slept into utter disappointment. Picture a gigantic flea market plopped down on a barren Texas landscape. It fit in with the rest of the country about as much as a Baptist church would have.

On the second day, when we were given the green light to explore, we found Afghan versions of Pizza Hut and

Burger King side by side with shops selling garbage souvenirs at inflated prices by people who were definitely not locals.

In the following weeks, we were bounced around to progressively smaller bases. American faces disappeared. On our last helicopter ride, the flat, dusty desert turned into dusty hills, which gradually gave way to an ocean of white-capped mountains—a landscape that was dramatic and hauntingly beautiful.

Our first couple of months verged on total boredom. We did plenty of planning, patrolling and speaking with locals, but overall, things were peaceful. But with the IED explosion, we knew that the Afghan "fighting season"—which lasts roughly from spring to early winter—had begun. And the definition of "normal" changed completely.

Mortar attacks were random and scary, but expected. Roads and hills promised danger, explosions, and bloody violence and filled us with wariness. Living like this affected everyone differently, and the release of stress took on various forms. A game of Monopoly might end in a fistfight; masturbation was a solo sport enjoyed by all. Will Ferrell became the patron saint of bored soldiers. And some of us experimented with the local drugs.

**'H**ey, guys! This is pot!" yelled a soldier.

We were on a foot patrol in late April. We all stopped to see what the hell he was talking about. It's funny—sometimes a person may be too focused on the trees to see the forest. In this case, the forest was acres of knee-high marijuana plants.

Until then, I'd only seen pot leaves on T-shirts and black-light posters, but there they were—fields of pot spread out before me.

In our unit, we had cops and criminals, college students and high-school grads, plumbers and ski bums, businessmen and career soldiers, but the reaction for all of us was pretty much the same: amusement and delight.

Just about everyone gave in to the novelty of the situation. We checked out the plants; some of us plucked the leaves and tucked them into our helmet bands and plate carriers for entertaining camouflage. Eventually, recess was over and we returned to our mission.

Over the course of our first few months, the snow melted and fed the narrow river that ran between the mountains, turning the valley—which had been relatively bare upon our arrival—lush and green. Low ground that had been easy to patrol



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# CAVI-TRACKER

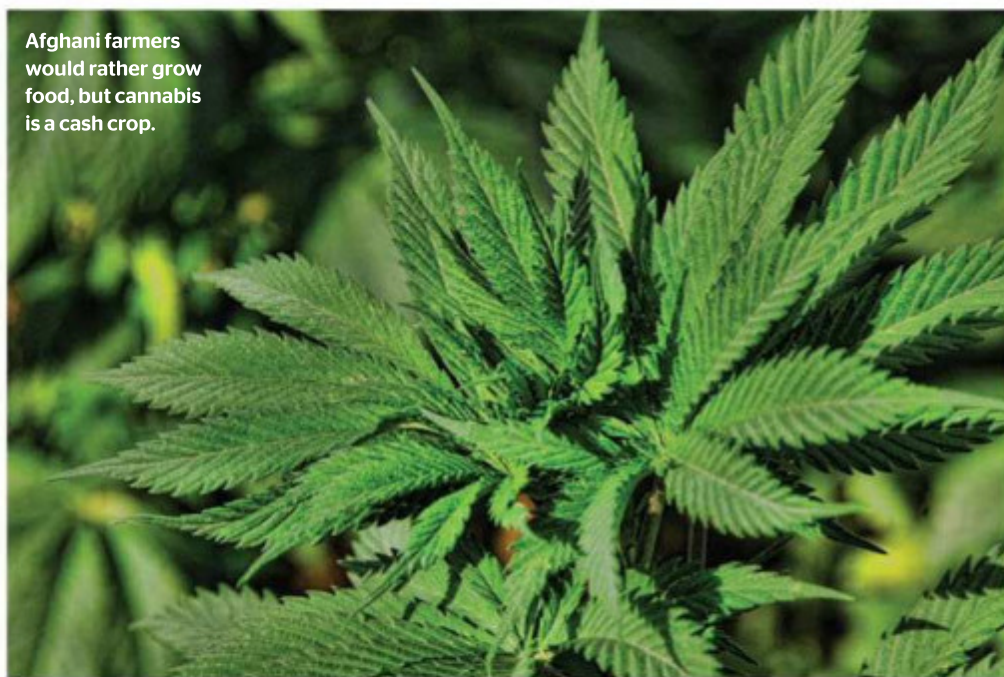
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Afghani farmers would rather grow food, but cannabis is a cash crop.



**There were no grow lamps or chemicals here: In these harsh mountains, on nature's schedule, a sea of weed thrives on goat shit, rain and sunshine.**

became dense with plant life.

The villagers of that area were very much in tune with nature's rhythms. Occasionally, we'd come across young men smoking a joint, but overall, the drug of choice for locals was hash—primarily a solo activity, performed a little way off away from everyone else. The use of pot, hash and *naswar* by the male population, while not flaunted, was tolerated and unconcealed. But no one seemed to show any more interest in their own crops of weed than they would a crop of potatoes.

I think they found our childlike reaction to the presence of marijuana both amusing and a little strange. That being said, if any of us asked the locals to sell us some, a stoner smirk or soft chuckle would crack their stoic exterior, before they returned to more serious posturing.

*Naswar* was 10 cents a brownie. A "hockey puck" of hash could be bought for five bucks, but pot was free to any hand that could grab. Our interpreters told us that the locals would rather grow food, but pot was their cash crop and had been for many years. There were no grow lamps or chemicals here: In these harsh mountains, on nature's schedule, a sea of weed thrives on goat shit, rain and sunshine.



Soldiers were stunned, but farmers showed no more interest in their gardens than they would a crop of potatoes.

**T**he attitude toward Americans changed around every corner. Some areas were openly hostile towards us: We'd get rocks thrown at us when we weren't looking, and the locals would spit insults and curses. Other times, we were greeted with open arms and friendly conversation. On some days, the villagers would simply stare at us with polite curiosity. Our interpreter would translate our questions and comments. Some of us shared water and played with the kids who were bold enough to approach us.

In the summertime, we were on a patrol near our outpost. At an altitude of 7,000 feet, the heat of day recedes quickly, and the air takes on a pleasant chill. One late afternoon, I walked over to the side of the road to watch the sunset.

The smell of dirt and the sound of buzzing bugs reminded me of the fields of cow corn that grew behind my grandparents' house in New England.

Another soldier and I wandered into the nearby pot field. The plants were thick around us. The initial novelty of fields of weed had worn off months ago. But it returned when the stalks began to tower above us and flower. As darkness set in, I lingered for a few moments, reaching out to touch the sticky resin and inhale its pleasant, skunky aroma. I plucked a few buds and stuffed them into my cargo pocket, then wiped off the resin on my pant leg.

Emerging from the field to the main body of our patrol, I turned and soaked up this outlandish vista: a land largely unchanged since the time of Alexander

the Great, a gorgeous landscape blanketed with green fields of marijuana—and leftover Russian landmines.

Part of our duty rotation involved working in guard towers. I discovered that, most of the time, the real enemy was the tedium of staring at nothing for six hours. In the summer months, when pot was available and I could sneak it in, my shift would begin with a small joint smoked in secrecy in one of the rat holes that the "eye in the sky" couldn't see. The "eye" was a rotating camera hidden in a black globe on a tower inside the outpost. It could rotate 360 degrees and pick up heat signatures, which was useful when pointed at the surrounding hills, but a pain in the ass when it was used to watch what we were doing.

Finishing up my joint, I put on my

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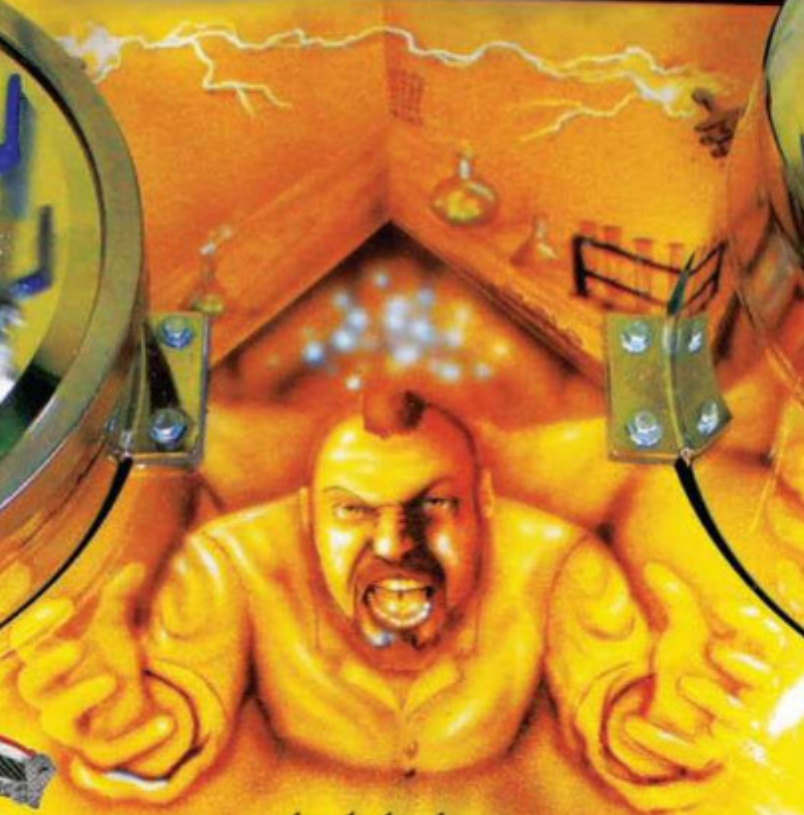
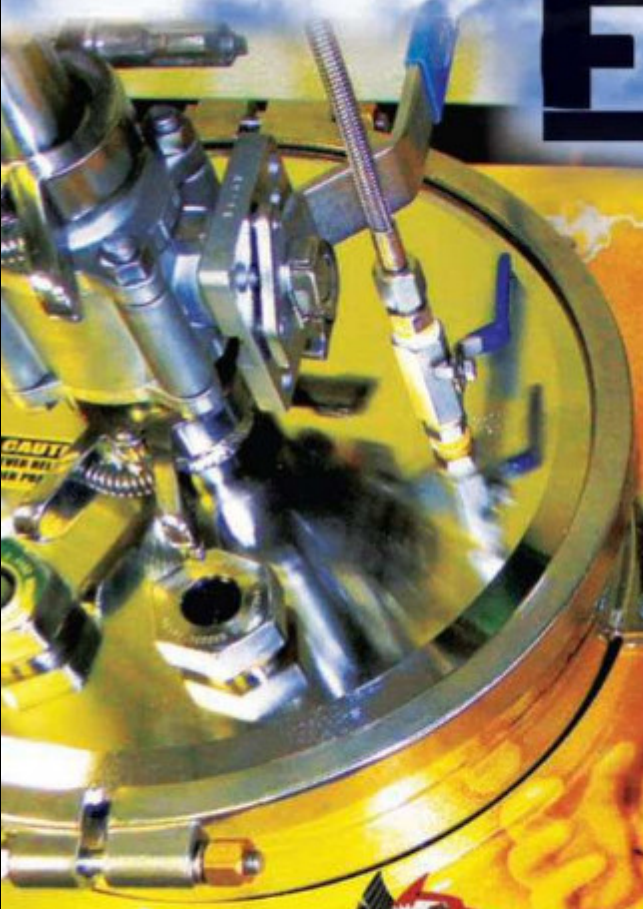


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body armor, grabbed my snacks for the night, slung my rifle and stuck a small bag of *naswar* in my pocket. The soldier before me handed over his radio. After exchanging pleasantries, I'd try to get as comfortable as I could before indulging in my favorite part of Afghanistan. I'd settle into my sandbag seat cushion and look out at the mud buildings dotting the landscape and the fields of green crops at different elevations, which gave the landscape texture. The mountains in the distance were part of the Hindu Kush range and cradled the entire area.



**For an hour, everything was quiet. Suddenly, gunshots shattered the mid-morning silence. All guns wheeled toward the nearby hills, which we thought were deserted.**

Two hours into my shift, the sun would begin to set, giving the landscape new dimensions. A piece of *naswar* in my mouth would carry me away peacefully in thought and memory. Movement in the fields would stop as the call to prayer rang out, echoing throughout the hills. An hour after sunset, cold winds would whip through the tower. In the darkness, red tracer bullets would occasionally streak the sky far off in the distance. These were the times I felt most at peace.

**T**ragedy struck in the late summer. A planned mission had been repeatedly postponed due to the weather. When the conditions were finally right, the plan had lost momentum, and the powers that be

wouldn't give us the support that had originally been promised.

We rolled into a Taliban-held area with a skeleton crew. For an hour, everything was quiet. Suddenly, gunshots shattered the mid-morning silence. All guns wheeled toward the nearby hills, which we thought were deserted. But we ceased firing after a few shots: The Taliban fighters were too close to our men positioned in the same hills. Our only recourse was to wait for an outcome.

A shallow river with steep embankments on either side divided the trucks

the Afghans spotted me, they stopped advancing. They surveyed the area, seemed to come to a group decision about something, and ran back in the direction they came, away from the fighting.

Our guys on the hill were still under fire, but now it was coming from a different location. I scrambled back across the stream to our MRAP.

The gunner on the truck started peppering the hill relentlessly with an MK-19 grenade launcher. I began prepping cans of "40 mike-mike," the 40 mm ammunition used by the gun. Adrenaline mixed with the summer heat was making the inside of the truck a furnace. Sweat streamed into my eyes, and my heart pounded like a jackhammer as I cracked open can after can of ammo to keep the gunner supplied. By the time shooting died down, only two cans of ammo remained. Soaked through and exhausted, I dropped down into the seat to catch my breath.

**A** battle-roster number is the first letter of a last name, followed by the last four digits of a Social Security number. Two battle-roster numbers were broadcast over the radio, which meant that two of our men were KIA—killed in action on that hill. But which two?

I ran through the names that started with those letters until I realized who'd been lost. I couldn't believe they were actually dead. We'd seen plenty of death at this point, but not on our side. Our fallen soldiers' bodies were removed by helicopter, and the fighting continued sporadically for hours.

Intercepted intelligence alerted us that a force as large as 200 Taliban was on its way to continue the fight against us. Though short on men and ammo, our requests to leave the area were repeatedly denied. One thing became grimly clear: More of us would die if a large force assaulted us.

Night fell. The gunners stayed in their trucks and scanned their sectors, while the rest of us pushed out to form a perimeter. I genuinely liked the man I was paired with and remember thinking that if we did get overrun, he was a good guy to spend my last moments with. It seems funny now, but at the time it was a genuine consideration, something that was important to me.

During the night, soldiers started dropping in all over the place from helicopters. Fresh reinforcements took over the perimeter and pushed it out. We

from the fighting. A few of us scrambled down and across the river to get a better view.

On the other side, I found a small shed-sized mud building for cover. As the gunfire continued, urgent calls came over the radio, but our new position failed to give us the clear line of sight we had hoped for. Again, we were forced to watch and wait.

I heard splashing in the river behind me. I turned to see a small group of strangers dressed like Afghan Border Patrol. The ABP were supposed to be friendly, but early on we'd picked up on the fact that, depending on the time and situation, they weren't necessarily on our side.

I wasn't at all happy to see them in our current state of vulnerability. When

**Afghani x Skunk #1**





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were allowed to return to our trucks.

I sat down in the driver's seat and looked out into the pitch black, untouched by electric light, and relived the events of the day. We began our guard rotation and talked a little while, until conversation trailed off. Soon, everyone except the man on guard was sleeping like the dead.

**A**fter that day, our overall mood changed dramatically. Sadness and anger brought a lot of us closer together. Within the platoons, small tribes formed. Before then, the locals and interpreters weren't trusted, but they were never treated poorly. Now, there were tense moments of open hostility toward them.

It was easy to be mad. We were mad at their side, mad at ours, mad at feeling like our friends' futures had been stolen from them. These feelings receded only when we attempted to celebrate our lives again. No longer was it just a select few who were partying; now, just about everybody was up to something.

We still cared about doing our jobs. Guns were cleaned, planning was done, and missions were carried out. But now we allowed ourselves not to give a fuck when we could. We sang, danced, played pranks on each other, planned for the



The Hindu Kush mountain range cradled the area.

future, drank, smoked pot more than ever and enjoyed being alive.

More mortars fell and more shots were fired, but our mission eventually did come to an end. Within about a year and a half, our outpost was given over to the Afghans. Now, the war there has been declared over.

Pot was a reliable friend that helped carry many of us through tough times. Our bodies returned stateside, but parts of our minds are still in-country, plagued by PTSD and depression. We hump over those mountains, wander through fields of weed and replay moments long passed. We are still taking casualties. 🌿

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# TANE WARS

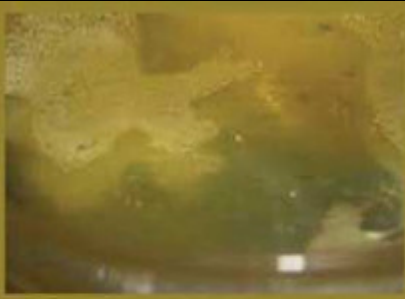
## Comparative Extraction Data by Brand

Cardinal Point reviewed extraction properties on a brand by brand basis. Capturing the following data points:

- Color of **first** extraction
- Yield of concentrate per gram of starting material
- Time to complete the initial purge
- Olfactory review of **flavor profile** of **finished** extraction

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**W**hile the performance of the Whip-It! brand Premium was superior in yield, color and taste profile, the results of the study reinforced to us that different brands of butane offer the extractor a wide range of solutions for the in-process issues that come up during the solvent based extraction. The rapid honey comb of the Vector and the smooth taste profile offered by Colibri are important arrows in the quiver of a knowledgeable extractor and the variables between brands should be further explored.



### WHIP-IT! PREMIUM

Instant tube pressurization was noted. Flush was light yellow and a thorough extraction performed in the first half of the allotted gas. Initial purge was swift and uneventful, secondary purge and material dried very quickly in the allotted time. Superior yield to other products sampled in the study by a significant percentage. The taste panel provided notes stating the taste profile is by far the best of those tested, the lack of harshness or "cough" was noted by all participants. The color was also preferred by the participants.

Color: Light Yellow  
Yield: 18.57%  
Purge Time: 11 min.  
Clean, excellent terp preservation, smooth



### NEWPORT

Newport flush was darker in color during the first flush. Initial purge took slightly longer than expected. Secondary purge took approx 2 hours longer than the other products tested in order to reach a fully purged state. Despite the production issues, the final extraction was noted by the test panel to be less "cough" or "harsh" than both Vector and Colibri.

Color: Dark Yellow  
Yield: 17.10%  
Purge Time: 14 min.  
Smooth, good terp preservation



### COLIBRI BLUE

Despite the low yield, Colibri demonstrated a fast and light colored flush. Initial purge was uneventful, however in secondary purge the Colibri extracted material demonstrated a "auto-budder" characteristic that is favorable to most mid-level extractors. The taste panel agreed, the final extraction was clean tasting, had a less distinct flavor profile than the other brands tested but the lack of "cough" was noted by all those participating.

Color: Yellow  
Yield: 14.20%  
Purge Time: 12 min.  
Smooth, moderate terp preservation



### VECTOR 5

The initial flush was noted to be light yellow where the other brands tested were noted as transparent yellow. The first purge was uneventful. During the secondary purge, the Vector extraction displayed different characteristics than the other brands tested. Within half the allocated purge time, the Vector extracted material formed a honeycomb disk and dried out very quickly. The taste panel advised the taste was smooth, however the consensus was that the post exhale reaction was more "coughy" or harsh than other brands tested.

Color: Dark Yellow  
Yield: 13.45%  
Purge Time: 13 min.  
Smooth, moderate terp preservation

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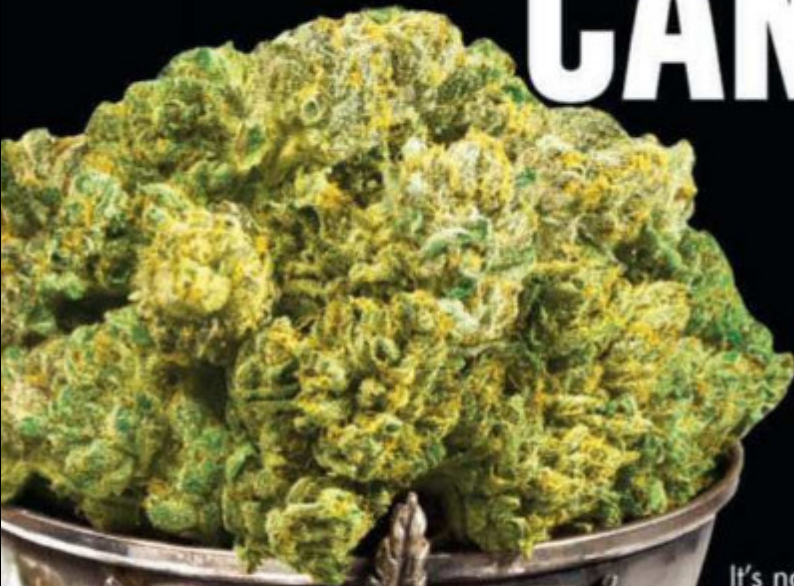


Photo: High Times® Photographer Lochfoot

It's not that we enjoy bragging, however the fact of the matter is there are no awards or categories for best nutrient companies at the major growing competitions. And because there's no award, and it's something we are proud of, we want to share this little-known fact with you...

Advanced Nutrients has been used to repeatedly win every single major grow competition in the world, and in all categories. Best Hybrid, Indica, and Sativa. Best Hash and Concentrates. Plus, seed companies Barney's, Big Buddha, and Rare Dankness (to name just a few) use Advanced Nutrients to grow their award-winning seed crops.

## Here's a list of some of our wins:

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- Hempcon
- Highway 420 Anti-Prohibition Rally
- Expocannabis Sur
- Cannabizz
- Nimbin MardiGrass
- Global Marijuana March
- Emerald Empire Hempfest
- Olympia Hempfest
- Hanfparade
- Seattle Hempfest
- Cannatrade
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- 707 Cup
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— Mr. Spliff of TGA Seeds, High Times Medical Cannabis Cup WINNERS

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— Rocky, Champs Cup WINNER

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Swerve runs the show at Cali Connection.



# Seeds of Desire

“Get Connected” is the Cali Connection’s mantra. The company is revving up its grow game, looking to connect with America as the nation’s premier seed provider. *Story & Photos by Dan Skye*

**T**he Cali Connection’s headquarters is one of those nondescript office parks that pop up throughout Southern California: long, one-story rows of identical adjacent spaces that businesses can lease for manufacturing or production purposes. A variety of business firms have taken up residence here, as well as industrial artists looking for secure studio space.

Seems like the Cali Connection has come to the right place:

The manufacture and production of prized cannabis seeds is the company’s mission, and seed breeding is definitely the kind of undertaking that requires an artist’s touch.

The breeder known as Swerve is the artist in residence here. He’s at the helm of the Cali Connection, a seed company that’s been supplying growers with top US genetics since 2008. In fact, says Swerve, “We were one of the first seed companies from America to sell our seeds worldwide.”



Naturally, the nursery is where the road to success begins.

## Breeding Advice From Swerve

**“Know what you’re going after. Have a good starting point. What’s your final destination? You have these two plants: What do you want to achieve, and how? What’s your end goal? Starting with your parents—say you’ve got a Sour Diesel and an OG, and your end goal is a larger-yielding, OG-tasting, Sour Diesel-looking plant: How do you achieve that?”**

**“Sure, you can take a Blueberry and cross it to Haze and see what happens. It’s fun—if you’ve got the time and the locations and can afford to do that. But most growers don’t have that luxury. In my world, being cost-effective is essential. Your time equals money. The electricity you experiment with equals money; same with the water and nutrients.**

**“But if it’s your only grow and the only lights you have, don’t experiment—go with what you know. Learn how to grow first. Know how to read the plant. Don’t start experimenting until you have a solid base of understanding of the way the plant grows and what your nutrients do. What does the plant need if it starts yellowing? Do you need nitrogen, magnesium, manganese or zinc? You have to be able to look at the plant and know, just by looking, what it needs.”**



Swerve’s crew labels the goods.



Get Connected Glass is Cali Connection’s latest diversification.

**“We ran with the Italian idea of being connected and having connections, then started providing the goods.”**

Inside the Cali Connection’s command center, assorted tasks are being performed. In one room, Swerve’s staff is counting out seeds and labeling them. In another, hundreds of glass rigs are lined up awaiting packaging and shipping.

The rigs represent Swerve’s latest undertaking: Get Connected Glass, a.k.a. GC2. He’s been marketing Get Connected apparel for over four years. Bins of hats, hoodies and T-shirts are stacked up, ready to be loaded onto a truck for transport to the upcoming Cannabis Cup, where the Cali Connection will, once again, set up its massive booth and greet the pot-loving public.

With legalization seemingly inevitable and a recovering economy on the rise, the Cali Connection, like most industry leaders, is discovering the discipline and attention to detail required for success.

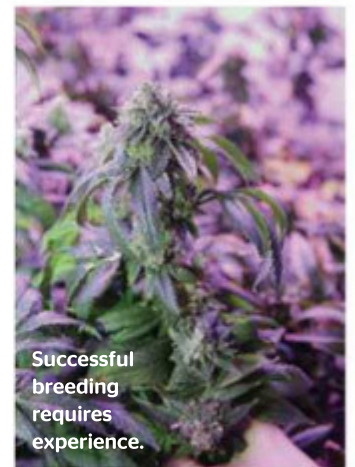
“It’s crazy,” Swerve confesses. “There’s no time! We maintain the gardens. We have to maintain the mother stock; we have to maintain the father stock; we have to maintain the reverse males; we have to maintain our genetics library.

We take clones by the thousands, because we have to keep up with customer demand and be able to fill our gardens to make seeds. That’s because our sales reps are out there kicking absolute butt! Then there’s the travel ....”

Not that Swerve’s complaining: Last year, Cali either sold or gave away approximately a quarter-million seeds worldwide.

Suffice it to say, leased office space can’t keep up with those requirements. A farm up in Northern California’s “Gold Country,” comprising 5,000 square feet of greenhouse space as well as an indoor grow, are responsible for the bulk production of the 140 strains included in the Cali Connection’s genetic library. As Swerve explains: “Up there, we’re trying to produce mass amounts so we can drop our prices to compete with the larger seed companies out there.”

Meanwhile, down here in the San Fernando Valley, Swerve has built a seed-breeding “loft” with multiple chambers over the Cali Connection’s office operations. It’s one of two breeding ops in the LA area.



Successful breeding requires experience.

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A massive seed crop nears harvest.

“When you’re indoor breeding, you can only lock in phenotypes,” he explains. “You can’t do large, open pollination and seed manufacturing. So we do our main breeding indoors, in isolated chambers, and then expand out to the greenhouses with the larger plants of the phenotypes

that we like—as our moms are—and use those as the seed-making babies and grow them big.”

The Cali Connection’s genetic library has been evolving for over a decade. Swerve recalls that it was back in 2004 when he first dropped off a tray of elite

clones and genetics to an LA dispensary for purchase.

“I spent years prior to that on online forums making friends,” Swerve says. “That’s how we used to do it. You went to the source—the actual person holding the genetics. Then we put clones out for the general populace and the medical community.”

That was the beginning of it all: Swerve’s cuts. During his clone-providing days, Swerve figures, he amassed about 150 mothers from different strains. As his reputation grew, he formed new partnerships with prospective seed companies, but they didn’t pan out. “I lost a lot of money and a lot of seeds,” he recalls.

By 2008, he’d had enough. “I went to my true roots, which are Italian, and thought, ‘What does everybody want? What does everybody need?’ And the one thing that I kept returning to was that everybody wants connections and everybody needs connections. It’s not what you know; it’s who you know. Everything we did came from California, so we ran with the Italian idea of being connected and having connections, then started providing the goods.”

One of the Cali Connection’s superstar strains is the San Fernando Valley

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The Cali Connection's award-winning Larry OG is a select Larry OG crossed with the SFV OG IBL ("inbred line," or a true-breeding variety). A joint of Larry will have you floating off into fluffy-cloud territory in no time. It's recommended for indoor growers but will also do well outdoors. (Just watch for mold late in the season due to its high resin content.)

Cali's Tahoe OG is a totally unique seed created by crossing the SFV OG Kush with its Tahoe OG clone. Growers can expect pot that packs a powerful punch and tastes as every bit as strong.

The Cali Connection's genetics have earned 30 different awards at High Times Cannabis Cups throughout the world, and the company expects to be enlarging its trophy case in the



Soon these seeds will produce cannabis in gardens worldwide.

years to come.

Swerve is diversifying, too, launching a brand-new seed company called Vault Seeds INTL. "We've been successful," Swerve says of Cali. "We hat-tricked at the Cup last year, grabbing three first prizes. But Vault Seeds INTL will offer varieties that the Cali Connection won't offer—at a more moderate price."

But why would that be necessary when Cali has earned such huge name recognition industry-wide?

"Because every label has a sub-label," Swerve replies. "Our sub-label is Vault Seed INTL. Our partnered offshoots are Moxie Seeds and a few new up-and-comers."

After all, with the cannabis industry expanding daily, there's no reason to think small.

"I'm trying to be the Sensi Seeds or the Green House of America," Swerve pledges. "That's always been my goal from the beginning."

And the quickest way to get there, Swerve knows, is by heading in a straight line. ✨

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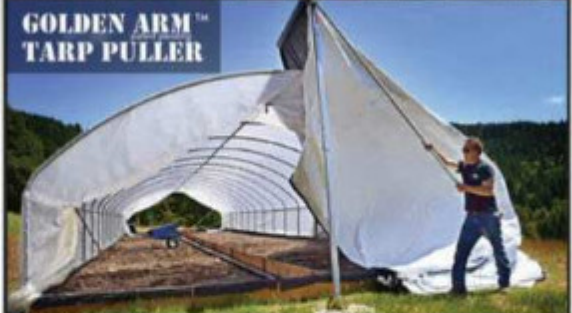


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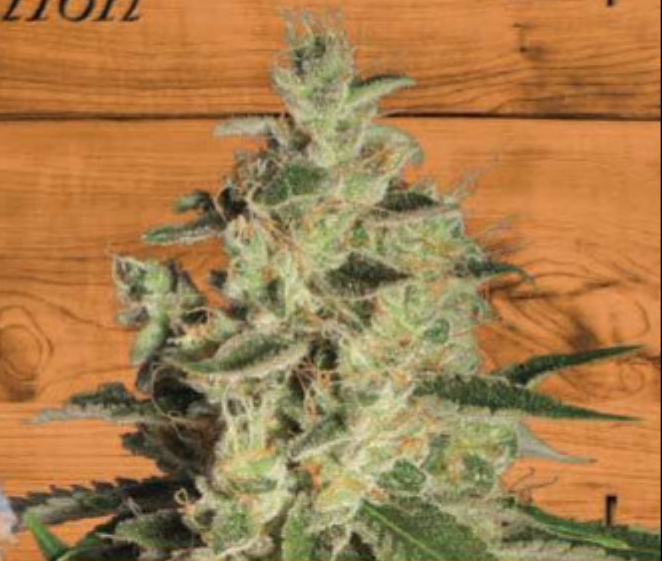
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# Cloning by Jorge Cervantes

Successful marijuana gardens begin with strong, robust clones. Grow guru and *High Times* Cultivation Department alumnus Jorge Cervantes reveals the ideal way to root cuttings in order to give your plants a healthy start in life.



Keep a clean room! Leaves on the floor should be cleared away three or four times daily.



All of these stems were cut on an angle so that more interior stem surface is exposed. This is where many roots will grow.

## Preparing to Clone

Cloning is the most traumatic incident that cannabis plants can experience, aside from harvest. Clones go through an incredible transformation when they change from a severed green growing tip to a rooted plant. Their entire chemistry changes: The stem that once grew leaves must now grow roots in order to survive. Clones are at their most fragile point in life just after being cut.

While rooting, clones require a minimum of nitrogen but increased levels of phosphorus to promote root growth. Sprays should be avoided during rooting, as they compound cloning stress. Given good instruction and a little experience, most gardeners can achieve a consistent 100 percent clone-survival rate.

Clones are exact genetic replicas of their mother plants. Each mother's cell carries a DNA blueprint of itself. Radiation, chemicals, disease and poor horticultural practices can damage this DNA—but unless it is damaged, the DNA remains intact.

Large cuttings with large, starch-filled stems grow roots more slowly than small clones with small stems. Thin-stemmed clones have fewer reserves (accumulated starch), but they need only enough reserve energy to initiate root growth.

Small clones with a few leaves need less moisture and will root faster than big cuttings with many leaves. At first the leaves contain moisture, but after a few days the stem is no longer able to supply enough moisture to the leaves, and the clone suffers stress. A small amount of leaf space is all that's necessary for photosynthesis to supply enough energy for root growth.

### Integrity in Parents

1. Maintain an 18-to-24-hour-a-day photoperiod for mother plants.
2. Keep the plants healthy.
3. Grow for six to 12 months.
4. Repot as needed.

### Easy-to-Clone Plants

Look for plants that have small nubs or rootlets (primordia) near the base of the trunk. Such plants tend to strike roots exceptionally fast. Most “Skunk” and *indica* varieties grow roots easily.

### Difficult-to-Clone Plants

*Ruderalis* crossed with *indica* or *sativa* varieties are auto-flowering and do not make suitable mother plants.

Outdoor varieties with a slight tendency to “pre-sex” (i.e., designate their sex) in an 18-hour photoperiod include Early Girl, Early Skunk and many others. Check with seed companies for details. Early flowering doesn’t always exclude a strain from being used as a mother plant.

Clones taken from weak, leggy mothers most often produce weak, leggy clones. Harvested plants that have been induced back into vegetative growth can also produce weak clones if not fully reverted.

### Precautions

Clones root well within a slightly acidic pH range of 5.5 to 6.6. Aeroponic clone gardens normally do best with a pH of 5.4 to 5.6. Always make sure there is plenty of air in the rooting medium to stimulate root growth.

Do not kill clones with kindness and fertilizer. At best, giving clones an excess dose of fertilizer causes rooting to be delayed. In fact, a dose of ammonium nitrate—a common salt-based fertilizer—will actually stop root hairs from growing.

Inexperienced gardeners and diseased plants cause most clone-rooting problems. Poor growing conditions also affect the strength of clones. For example, watch out for miticidal dips that coat the leaves too heavily. These dips should cover well enough to protect your plants



These mother plants provided hundreds of clones, and were finally moved outdoors and harvested in the fall.



Transplant clones before they become rootbound!



These clones were just taken and still need to get used to their new environment.

by providing insecticidal and anti-fungal properties, while still allowing their stomata to breathe.

### Getting Started

Taking clones, or cuttings, is the most efficient and productive means of cannabis propagation for many indoor,

greenhouse and outdoor medical cannabis gardeners. Once the desirable female plants have been distinguished and selected, branch tips and branches can be cut and rooted.

Disinfect all tools and working surfaces to kill any bacteria, fungi, viruses and other diseases already present. Sterilize a sharp pair of scissors, razor or razor blade by dipping in alcohol, vinegar or bleach (a 5 to 10 percent solution) or by heating with a torch. Wash your hands thoroughly beforehand. Be sure to have all cloning supplies within arm’s reach—rooting cubes, rooting hormone, razor or scissors, humidity dome, etc.—before you start to take clones.

The process is done in simple steps. Prepare the mother plant in advance. Take the cuttings with clean (sterile) instruments. Store the cut clones in water. Insert the cuttings in a growing medium or aeroponics system. Place the clones under a humidity dome/tent. Carefully monitor the grow medium’s moisture levels and humidity. Watch for root growth. Transplant when roots emerge from the rooting cube or medium. Harden off by gradually exposing the cuttings to their new environment.

### Troubleshooting Clones for Pests and Diseases

If a spider-mite infestation occurs, many gardeners destroy the infested clones and start over with clean ones. Others spray with aerosol pyrethrum or another organic miticide. Remember, all pesticides, natural or not, are phytotoxic. In general, spraying cuttings is a bad idea, including with anti-desiccant sprays. Sprays clog the stomata and can impair root growth in clones. If you must use sprays, use natural organic ones, apply them when it is cool, and keep their use to a minimum.

If the roots on a clone are circling the container and already turning dark near the center, this signifies overwatering and impending death. Do not overwater clones. Keep the medium evenly moist, but don’t let it get soggy. Any kind of stress—including overwatering—disrupts plants and slows their growth.

Different mediums have distinct watering schedules. For example, rockwool holds water a long time, while peat pellets need watering more often. Clones are tender and have small, developing root systems, so they need extra-vigilance now.

As stated earlier, keep your cloning area clean. Do not take clones where

Average Root Growth for Cannabis Clones

Action	Cut from young mother	Cut from old mother
Cell division starts	Day 4	Day 6
First root nubs form	Day 6	Day 10
Roots start to grow	Day 7	Day 20
Enough roots to transplant	Day 14	Day 28

This table shows the average times for roots to grow from the stem. Clones taken from younger plants will root faster than those taken from older ones.



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fungus spores and diseases are hiding! Pythium flourishes in places with high temperatures and excessive moisture, while powdery mildews prefer cool, moist conditions.

Spider mites, whiteflies and thrips love weak, tender clones. Cooler, humid conditions—from 65°F to 78°F (18°C to 25°C)—inhibit most mite reproduction and avert infestations. But cool, humid conditions may also increase the chances of certain fungal attacks. Remove any diseased or infested clones from the cloning room immediately.

### Root-Inducing Hormones

Root-inducing hormones may help speed cannabis-root development, but they're most often used to help strike roots on woody plants that are not meant for human consumption. Medical cannabis gardeners tend to avoid dangerous synthetic rooting hormones such as IBA and NAA\* altogether and wait a few extra days for the roots to grow.

Use an aero-cloner or deep-water cloner (also known as a DWC or bubble cloner) to expedite root growth. Using merely plain water under the proper conditions, you'll see roots strike on 80 to 100 percent of your clones a mere one to three days later than if hormones were employed. Root-inducing hormones also have less effect when the conditions are just right and the roots are naturally ready to grow.

*\*IBA (indole-3-butyric acid, 3-indolebutyric acid, indolebutyric acid) is synthetic and classified by the Environmental Protection Agency as an agricultural chemical and pesticide. It is also a mutagenic, meaning that it's liable to cause mutation. NAA (1-naphthalenaecetic acid) is a synthetic product registered with the EPA as a pesticide.*

For the stem of a cutting to develop roots, it must go from producing green stem cells to manufacturing undifferentiated cells (callus) and, finally, to creating root cells. Once undifferentiated, the cells quickly transform into root cells.

As soon as a cutting is taken, the clone starts dispatching natural rooting hormones to the wound; these hormones arrive in full force in about a week. The use of artificial rooting hormones fills the need until the natural rooting hormones take over.

Most commercial rooting hormones contain IBA or NAA (or both). Many root-inducing hormones also contain a fungicide to help prevent pathogens. Read the labels on these products carefully, since they often contain different concentrations of these synthetic ingredients. When purchasing, search for value.



Clones below are exact genetic replicas of mother plants above.

### Using Liquids, Gels or Powders

Rooting hormones are available in liquid, gel or powder form. The liquid forms are easy to dilute. Gels are easy to keep consistent and are simple for novice gardeners to use. However, the powder forms are the choice of most professional gardeners because they're inexpensive, consistent and cause no problems. Natural root-inducing products such as willow water come in liquid form and can be used over the long term. (Note: Do not apply rooting hormones—whether as liquid, gels or powders—above the soil line, as excess stem swelling can occur.)

Root-inducing gels are easy to use and the most practical for small amounts of cuttings. Gels are not water-soluble; once applied, a gel holds and stays with the stem longer than liquids or powders.

The cut end of a clone stem can often develop a fungal infection. Many rooting powders contain a mixture of talc and IBA and/or NAA for this reason. Powders are less expensive than liquids or gels, and many professional cannabis growers prefer to root their cuttings using powder because it is so consistent and easier to contain than liquids or gels. (To avoid contamination, simply pour a small amount into a separate container and throw away any excess.)

To apply a powder, roll the moistened stem of the cutting in it to achieve a thick, even coat. Tap or lightly scrape the excess powder off the cutting (excess hormones can hinder root growth). In the rooting medium, make a hole bigger than the stem; if the hole is too small, the rooting powder gets scraped off upon insertion.

Some cannabis gardeners prefer to soak their cuttings in a diluted liquid rooting solution (20 to 200 ppm IBA and/or NAA) for 24 hours. However, I've seen few gardeners use this time-consuming technique, and I'm not sure it's more beneficial than simply dipping the stems.

## Rooting Products

To determine a rooting hormone's concentration, multiply the manufacturer's listed percentage by 10,000 (e.g., a product with 0.9 percent IBA contains 9,000 ppm IBA). Warning! Rooting-hormone products containing IBA and NAA are not recommended for use with edible plants. Root-inducing hormones should not be used to grow medical cannabis. Read the label carefully before deciding to use these or any products.

**Hormex is an IBA-based powder available in six different strengths ranging from 1,000 to 45,000 ppm.**

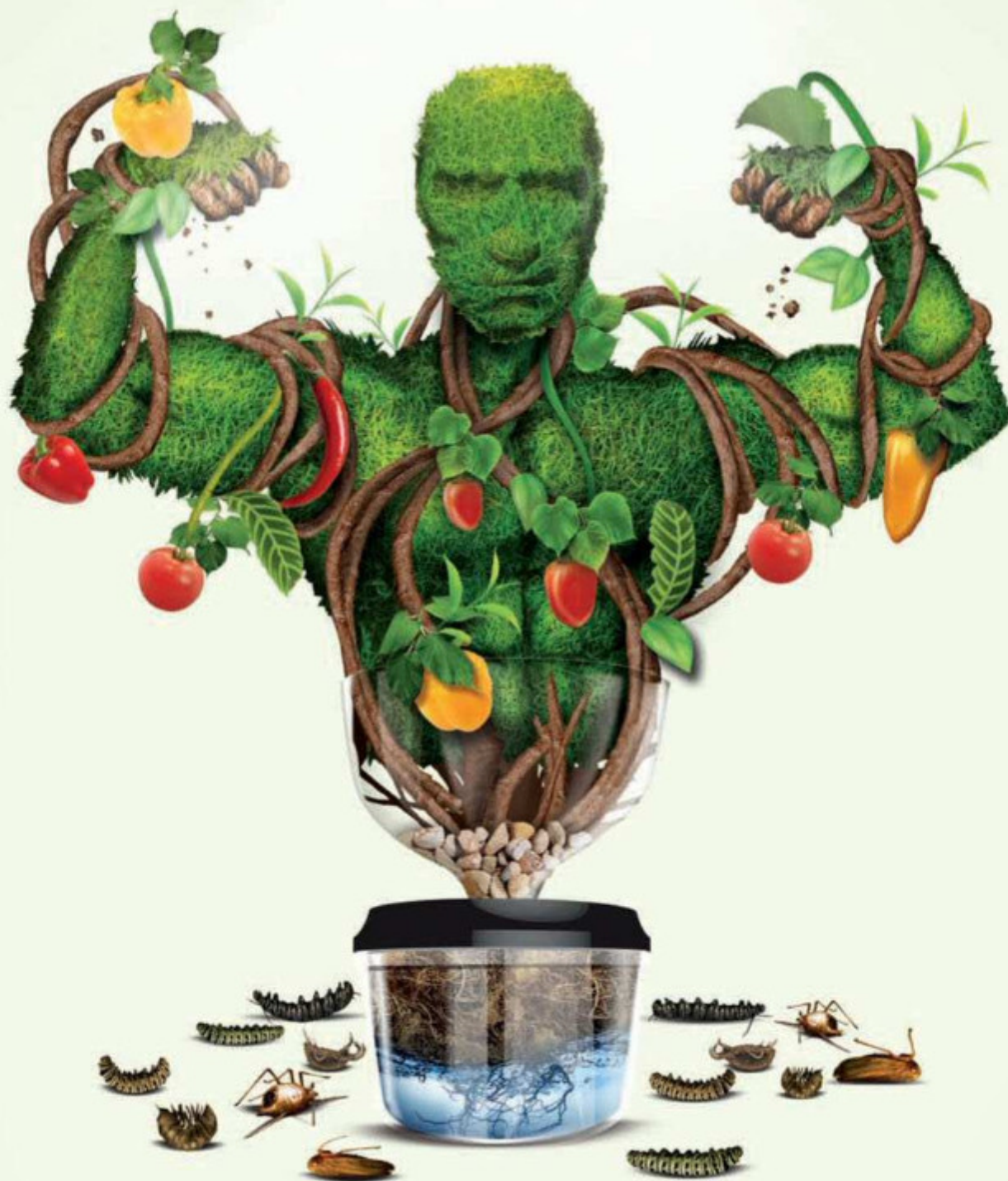
**Rhizopon AA (Rhizopon BV) is an IBA powder from Hortus USA, the world's largest company devoted to the research and manufacture of rooting products. It's available in both powder form and as water-soluble tablets, in strengths from 500 to 20,000 ppm.**

**Clonex cloning gel is a blend of vitamins, minerals and antimicrobial agents (0.3 percent or 3,000 ppm IBA). The gel seals the cutting's tissues, thus reducing the chance of infection and embolisms.**

**Dip'N Grow is a liquid rooting concentrate that contains IBA and NAA and is antibacterial. The cost is one penny per 100 cuttings.**

**Olivia's Cloning Solution, originally developed for use in hydroponic cloning, is another of the many root-inducing hormones available today.**

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Richard Lee, of Oaksterdam University, inspects clones in a spotless clone room.

**Make Your Own Rooting Solution**

Willow water, made with branches from the willow tree, is a natural way to induce rooting. The substance in willow trees that promotes rooting is unknown, but repeated experiments have shown that willow water promotes about 20 percent

more roots than plain water. Willow water can also be mixed with commercial rooting hormones for improved results.

To make willow water, find a willow tree and remove some of this year's branches that are about one and a half inches in diameter. Remove the leaves

and cut the branches into 1-inch lengths. Place the 1-inch willow sticks on end, so that a lot of them fit into a water glass or quart jar. Fill the jar with water and let the sticks soak for 24 hours, then pour the water off and use it as a rooting hormone. Soak your cuttings in the willow water for 24 hours and then plant them in a rooting medium. If you're using a commercial liquid rooting hormone, substitute willow water for regular water in the mix.

**Other Options**

Coconut milk contains the cytokinin zeatin and encourages clone-root growth. Mix equal parts coconut milk, grated coconut meat and clean, hot water in a blender and then blend until smooth. Use this mixture to water your clones.

Several commercial rooting products contain trichoderma bacteria or mycorrhizal fungi, both of which help plants grow bigger, stronger and faster. As always, read the label carefully before deciding to use these or any products. ✨

*Adapted from The Cannabis Encyclopedia, by Jorge Cervantes, \$50 (softcover) \$70 (hardcover). Find it at Amazon.com or by visiting Jorge's website, MarijuanaGrowing.com.*



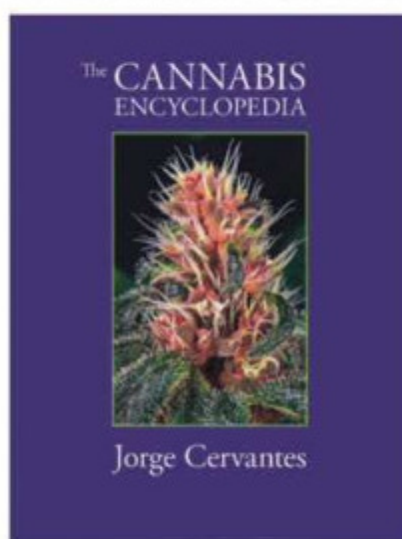
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INTERVIEW BY  
CHRIS SIMUNEK

# GEORGE JUNG

THE HIGH TIMES INTERVIEW



A free man  
after nearly  
20 years

**G**EORGE JUNG IS ARGUABLY THE MOST FAMOUS DRUG SMUGGLER IN AMERICAN HISTORY, THANKS TO THE MOVIE *BLOW* (IN WHICH JUNG WAS IMMORTALIZED BY HOLLYWOOD IDOL JOHNNY DEPP), AND THE BOOK BY JOURNALIST BRUCE PORTER UPON WHICH IT WAS BASED. *HIGH TIMES* CAUGHT UP WITH HIM RECENTLY WHILE HE WAS ON PAROLE FROM FEDERAL PRISON AFTER SERVING NEARLY TWO DECADES FOR SMUGGLING MARIJUANA.

GEORGE JACOB JUNG WAS BORN ON AUGUST 6, 1942, IN BOSTON, MASSACHUSETTS. IN THE LATE '60S JUNG BEGAN SMUGGLING MARIJUANA FROM MEXICO INTO THE US. BUSTED IN CHICAGO IN 1974, HE WAS SENTENCED TO FOUR YEARS IN THE FEDERAL CORRECTIONAL INSTITUTE IN DANBURY, CT. AT DANBURY, HE MET MEDELLIN CARTEL ASSOCIATE CARLOS LEHDER, AND THE TWO CONSPIRED TO RAIN A WHITE-POWDER BLIZZARD DOWN UPON AMERICA THAT WOULD INHIBIT THE SEROTONIN REUPTAKE OF MILLIONS OF PARTY PEOPLE AT

THE END OF THE '70S, MAKING THEM BOTH INCREDIBLY RICH MEN. THROUGH LEHDER, JUNG BEGAN WORKING FOR PABLO ESCOBAR, THE COLOMBIAN DRUG LORD WHO MURDERED WITNESSES, JUDGES, POLITICIANS AND CITIZENS ALIKE IN HIS RUTHLESS RISE TO THE TOP OF A \$30 BILLION COCAINE EMPIRE.

WITH ESCOBAR, LEHDER BOUGHT PROPERTY ON AN ISLAND IN THE BAHAMAS CALLED NORMAN'S CAY, WHICH WOULD BECOME THE CARTEL'S MAIN SHIPPING POINT FOR PLANES FLYING COCAINE INTO THE UNITED STATES. AFTER LEARNING THAT LEHDER WAS OFFERING TO SNITCH OUT THE CARTEL, JUNG TESTIFIED AGAINST HIM AND WALKED AWAY CLEAN FROM A LONG LIFE OF CRIME. BUT, AS HE EXPLAINS IN THIS INTERVIEW, THE STRAIGHT LIFE DIDN'T APPEAL TO HIM.

JUNG'S MOST RECENT BOOK, CO-WRITTEN WITH T. RAFAEL CIMINO, IS ENTITLED *HEAVY*. HE ALSO SPONSORS A LINE OF JEANS AT [CBDJEANS.COM](http://CBDJEANS.COM).

**You started your smuggling career in Southern California in the late 1960s, buying weed cheap and then driving it to Massachusetts to sell at a considerable markup. Today, the medical pot industry in California has driven marijuana prices down so low that people are doing the same thing: driving it east and selling it at a higher price in states where it's not legal. It seems symbolic of the ineffectiveness of prohibition.**

In this country, we have a police force that's addicted to drug money. I've watched law enforcement since the 1950s—when it was virtually nonexistent—grow to be a monster that's intent on arresting our children for a consensual nonviolent crime and putting them in penitentiaries. There's something wrong with that—I mean, that's *insane*. And we have two or three states that legalized, and the rest of you can walk into another state and get 10 years in prison.

**You just did 20 years for marijuana. You got caught with a couple hundred pounds, and right now there's probably a dispensary not far from here that sells a couple hundred pounds a month legally and pays taxes on it to the government.**

Realistically, I didn't do 20 years for the 200 pounds—I did 20 years for my whole life of being a radical, okay? I had an extensive conversation with the judge before I was sentenced. I says, "You're going to send me away for the rest of my life. I wanna talk to you." I go into his chambers, all right? And he looked at me and said, "You had \$100 million, and nobody knew who you were. It was perfect. Why didn't you just go away? And I never would have had to do this today. If everybody lived their life like you do, we'd have complete unrule and we'd have no structured society." And he



Johnny Depp meets George Jung in prison.

**"The producer, Denis Leary, called and he said, 'I found the right person—Johnny Depp.' And I said, 'Who the hell is that?' And he said, 'Edward Scissorhands.' And I said, 'What the hell is that?' And he said, 'Meet him.'"**

said, "I understand your free will and your existentialism, but unfortunately you chose a path against the law. You broke the law every day of your life as an adult, and I have no choice."

**There's a part in the book *Blow* where you say that rather than incarcerating smugglers, people should pick apart their brains. Tell me about that "thrill junkie" thing.**

People don't grow up to become thrill junkies—they're *born* like that, right? I was the kid who would take the car out at night when he was 16 and see if he can redline it. And then there's the kid who will be careful of it because it's his dad's car, or whatever, and drive it safely home and go to bed.

And that's how my whole life was. When we started dealing, the guys I worked with, they didn't want to go to Mexico and start smuggling, because they weren't in it for the thrill. In fact, the majority of them went on to graduate college; a couple of them took

the marijuana money and invested it, buying properties and this and that. But that wasn't what it was about to me. It was the thrill.

And then, later on down the line, a strange thing happens to you, and the thrill is from the fear. And then you want to get it done and get back to Manhattan Beach and the volleyball and the girls and the whole thing. And then, one day, you just don't want to go home, because nobody lives there anymore and you're not afraid. And that's when it's over for you. Your whole being knows it's over, and you're self-destructing. And a lot of people in this business will tell you that.

That's a terrible price to pay because you loved life so much, with the intensity of a thousand suns, and the women and all of it—and then it's all taken away from you. You end up walking the hallways of always to a place called tedium and apathy, day after day after day. Years go by. Anyway, on a brighter note...

**You hung out with Liz Taylor and Richard Burton when you were moving loads from Puerto Vallarta in the '60s, right?**

I lived up in a place called Gold Gringo Gulch. Liz and Dick bought a house there, and I lived next door to them. I used to drink with Richard Burton at the Oceano Bar in the afternoons. I remember one time Liz was out shopping, which she always was, and we were sitting at the bar. I mean, the bar was right out of *Casablanca*—it was beautiful. And Liz had a little entourage carrying all her packages and everything, and Dick looked at me and he took a drink, and he says, "There she is, the most beautiful bitch on the planet—and she's mine."

**Did you ever think people would be filming movies and documentaries regarding your life?**

I sat down and I wrote a book called *Grazing in the Grass Before the Snow Came* [the precursor to *Blow*]. It took me a year to write it in a little prison cell, and this is the God's honest truth: When I was doing it, I thought, "This is going to be a book *and* a movie."

**How did Johnny Depp come into the picture?**

The producer, Denis Leary, called and he said, "I found the right person—Johnny Depp." And I said, "Who the hell is that?" And he said, "Edward Scissorhands." And I said, "What the hell is that?" And he said, "Meet him."

And Johnny got the special visit, and he came in and he looked like he had slept in a dumpster—skinny, his hair hanging down and greasy, ripped leather jacket, holes in the sleeves, Vietnam army boots—and I said, "Jesus Christ, what happened to you?" He said, "I was up all night thinking of what to bring you. It drove me crazy." And he handed me *On the*

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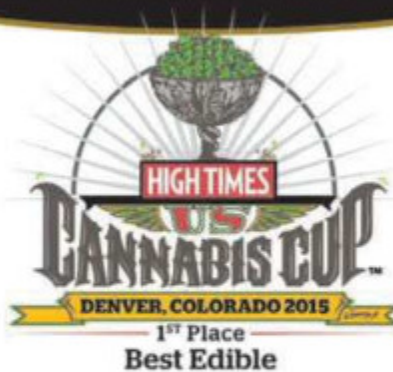
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*Road*, by Kerouac. He said, "This is my Bible. I carry it with me everywhere I go. I want you to have it." I had read it when I was in high school, and that Kerouac pumped me up to be crazier than I was going to be, all right? And that's when we bonded.

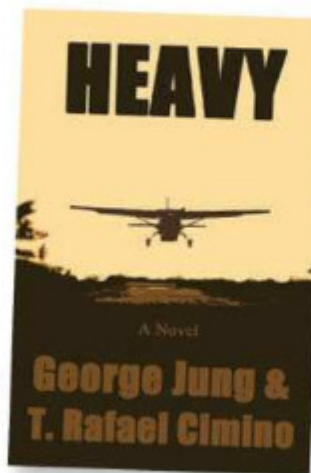
He would come on visiting days, and I would just walk around in circles and keep talking and he would watch me, and one day I told him, "I'm not walking any more circles—it's over." And he said, "Don't worry, I got it."

And the parts that I did see of *Blow*, he got it. He *became* me.

**Was Pablo Escobar already at war with the Colombian government when you started working with him?**

That didn't happen till later. He wanted to become a part of Colombia's ruling class, and he thought that money would get him in there. But that is reserved for a select group of people: the 10 percent that owned 90 percent of the arable land down there. And they run the government, and they run everything; they own the coffee and this and that. And Pablo was never born into that class structure, and it didn't matter how many people he bought off—he was *never* gonna get into that sacred gilded hall, okay?

And then he began to get pissed off about it, and that's when he turned. He figured if he couldn't join the club, he'd destroy the club. I told him, "You need to get out of here—they're going to kill you. You need to take all this money and get out of here with your son and your wife and go." And he said, "I will die here." There was nothing left to say.



**"I've had so many great experiences in my life, of living total free will, that I wouldn't change it for all the gold in the earth."**

**Had you not met Carlos Lehder in Danbury, do you think you would have gotten into the cocaine business?**

Never. Never would have happened.

**You visited Norman's Cay, right? What was that like?**

Well, in the beginning, it was just a remote island; people had found it and settled there, built houses there. What we saw was a place where you could land, refuel and fly. At first, we were landing in the Bahamas and keeping the plane there overnight and then coming in on Sunday with the "mom-and-pop traffic," as they called it. It was hundreds of planes coming back from the islands on Sunday night to the mainland. And the radar screen was full of little blips everywhere, and you were just another blip. And we'd get up to the Carolinas, and we had a place up there where we landed our load.

But I never wanted

Norman's Cay. I thought, "A man on the move does not get busted." I had a huge difference of opinion with my partner Carlos, and that's when we went our separate ways.

**When you visited, was Carlos acting irrational? Did you think he was crazy?**

He wasn't crazy... he had delusions, though. He loved John Lennon and Adolf Hitler at the same time. That should have been a sign for me.

I mean, Walter Cronkite showed up there, and these thugs came with machine guns and told him, "You better leave." It just turned into a freak show, and Carlos actually thought at one time he wanted to take over the country of Belize. I told him, "You wanna become a dictator? Or you wanna become rich and go live in Monte Carlo for the rest of your life?"

And his thing was that he wanted to hire cheaper pilots because the greed got to him. I wanted to keep using pilots I could trust. And in the end, it was a pilot that he hired for chump change out of Jacksonville—an appliance salesman at Sears and Roebuck who bought a half-million dollar home and couldn't explain it—who gave up everybody.

It was easy to get pilots. One thing that I never, ever forgot was opening up a briefcase with a million dollars in it and showing it to this guy who flew for commercial airlines. I said, "There's one stipulation: You have to show me where your kids go to school—and where you live." And they would look at me, and look at the money, and they would say, "Okay." And I thought to myself, "Oh my God, just how sick is this?"



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**You were asked to testify against Carlos Lehder, but you sought permission from Pablo Escobar to do it. Can you tell me how that went down?**

Well, at first, I... I mean, that was a dirty word to me. And, actually, it was still under the one-third-parole situation—I was going to do no more than five years. I wasn't afraid of the time in prison; five years was not much.

I was approached to testify, and I told them no way, I would never do that. Then, several weeks later, it was in the *Miami Herald* that Carlos had written a letter to George Bush saying that he was going to give up all the information that he could about the cartel for his freedom. I was being held at the North Dade Correctional Center, and they showed me the paper, and then the top of my head blew off. That's when I agreed to do that—but I asked permission and was told to go ahead.

**And so, after you testified against Carlos Lehder, you were free.**

Right.

**Why did you make that decision to start smuggling again?**

I was just bored, to be honest with you. A friend of mine had made like \$25 million, and I went over to his house. He had flown loads out of Colombia—he was a fighter pilot in Vietnam—and his wife said, "I've lost him." And I said, "What are you talking about?" And she said, "He's just drinking scotch from 6 o'clock in the morning until he passes out at night."

So I went out there and I said, "Dave, what's happening to you?" And he said, "I can't stand this." I said, "Stand what? You have a beautiful home, you have a beautiful wife, you have all the money in the world." He said, "It doesn't mean a

fucking thing. I want to fly another load." And I said, "Is that all that's wrong with you? Come on!"

**How long you were flying loads before you got caught?**

We did a half a dozen, or whatever. And I didn't care so much about the money—I just cared about the action. It's like a gambler: He needs money as a tool, to be able to gamble. And the drugs were a tool to me, to be able to get *my* high. But by then I had lost it. I was like Brett Favre, you know? He was old, and he lost his step, but he loved the game so much that he went out there even though he knew they were going to laugh and throw beer cans at him.

People that don't have the love of that high, they'll never understand it. It's like screaming into the wind. What Brett Favre did, you don't go to jail; you just go to your farm in Mississippi and sell jeans, okay? But what I did, you go to jail.

They used to make west-erns with the old gunfighter who is called out into the street by the kid—and he went out there and knew he was never coming back, but he went because it was over. And in a way, it's terribly sad—but in another way, it's Shakespearean. We live as we die—*alone*—and even though I spent 20 years in prison, a few other years [incarcerated] here and there, I've had so many great experiences in my life, of living total free will, that I wouldn't change it for all the gold in the earth. And I hope there's a life after life—and maybe I can even come back again and get on another train, and ride and gain some more wisdom, and be able to sit here and give it back to *High Times*. ✨

*Special thanks to K from Trichome Technologies for making the connection.*



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A passion for genetics, growing and teaching are all discovered and for hire at The Ethos Collective.



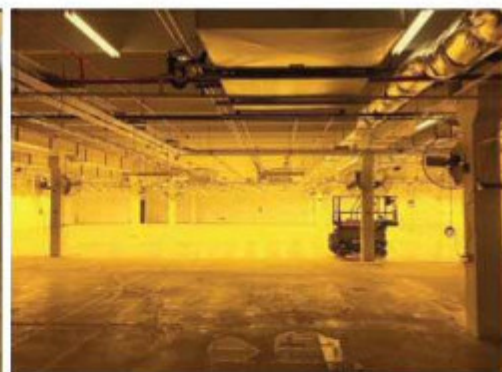
**C**olin Gordon, founder of The Ethos Collective in Denver, started growing in 1993 after bringing a pack of seeds back from a trip to Amsterdam. “I liked good product, but couldn’t afford good weed. So I grew my own.” After crossing Skunk 1 with NL5 x Haze (the Cannabis Cup winner that year) Gordon’s experiment generated a dozen seeds, and he was hooked. “I’m a seed addict. I love popping seeds and watching the process—the flowering, looking at the different gene expressions is just fun.”

Fast forward 22 years, and Gordon brings that same passion for genetics to his own business and through teaching others how to begin their own grows—start to finish. “We start off by creating an architectural plan, including everything from the sketch of the room,

**“Each client is different. Some want us to do everything from hiring their growers, and starting their genetics to doing a complete growroom set-up.”**

to lighting designs, nutrient systems and environmental controls like ventilation. Some clients may just want us to help them sell a grow, it could be existing already, or others may contract us to teach them how to get growing—market, brand and get their product in stores.”

Gordon has experienced the green rush and the green grab firsthand as Colorado becomes saturated with first time, would-be ganjapreneurs. “A lot of people call and want to get into the industry. I immediately vet them and advise them into [paying] a retainer, and explain to them that there are a lot of obstacles. If they still want to get into cannabis, we either sign a short- or long-term contract, depending on their needs. Each client is different. Some want us to do everything from hiring their growers, and starting their genetics to doing a complete growroom set-up. We not only have the knowledge, but six years of hands-on



**Clockwise, from top left: The Ethos Collective seed packs; a 220 Gavita lamp build out for Sweet Leaf; poppin’ seeds is Gordon’s favorite; Ethos Collective’s own strain Temple Kush.**

experience in commercial grows that a lot of newcomers can appreciate.”

With the mortgage crisis and the fall of the housing market in 2008, Gordon was “unhappy with the current situation and wanted to change the ethos of the cannabis industry.” During the crash he taught unemployed friends how to cultivate by setting up 10 to 12-light grows in their basements. “They had no idea that they could legally grow and sell weed.”

A lot of teaching and consulting, Gordon says, is about having conversations. “I was a poker coach and I was surprised

how easily it translated into cannabis, but you have to know your toolbox.” For Gordon, that came from a year working in a hydro shop and talking to everyone from nutrient experts to technology reps.

Gordon continues to teach and grow The Ethos Collective, having recently inked a deal to merge with Dynamic Grow and distribute Ethos Seeds in Illinois, Washington, Oregon and Nevada. “Dynamic Grow has the forward thinking to distribute our strain genetics. You’ll be seeing Ethos in these states, and every future medical and recreation state.” 🌿

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# Expert Grow Advice

Greenhouse security, windowsill weed, power outages, strain names and more ...



Send your cannabis cultivation questions to @deardanko or deardanko@hightimes.com.

SUBJECT: **Cross-Pollination**

FROM: **Farmer Bob**

🌿 I'm growing outdoors, and I have vegetables growing with my weed. Can I get cross-pollination—like from the tomatoes? I'm afraid I might end up with seeds that aren't good quality.

Dear Bob,  
Not to worry: You will not get any cross-pollination between your cannabis plants and your vegetables. The only way you might wind up with seeds is if your own plants exhibit hermaphroditic tendencies and pollinate themselves, or if other cannabis or hemp plants in your area wind up seeding your crop. (Keep in mind that some areas have had wild hemp plants growing for many years, and their ultra-light pollen can travel miles in the air.) But rest assured that no tomatoes or cucumbers will wind up crossing with your pot plants.

Marijuana plants can only be pollinated by other marijuana plants.



*Danko Tip:* If your plants are stretching too much, lower your grow light closer to the canopy level.



A locked gate will keep out unwanted visitors.

SUBJECT: **Secure Greenhouse**  
FROM: **Dani Near Barcelona**

🌱 I've been growing in a greenhouse for several years now, but some of the younger people living nearby have found out about my plants, and I'm worried that they might come and try to steal something from my grow space. Is there any way I can secure my greenhouse so that I don't have to worry about thieves running away with my crops?

Dear Dani,

The best way to secure your greenhouse is to put a strong lock on the door and employ basic security measures, such as motion-detection lights, that will alert you to the presence of intruders. Hopefully, the bright light coming on will scare off any thieves without you having to confront them personally. The lock won't keep them from cutting through the tarp material or breaking the glass to intrude, but it should work as a deterrent and make them think twice before trying to rip you off. Also, it might not be a bad idea to get a dog that can let you know if someone's on your property.

SUBJECT: **Window Weed**  
FROM: **Harry M.**

🌱 I've got a cannabis plant on my window ledge. It's been growing for maybe a week now and seems to be going along fine, but I live in the UK, so it's not the best conditions for her. I'm wondering if there's anything I need to do to bring on the flowering stage, as I can't alter the lighting. Any help would be great.

Dear Harry,

Pot plants need plenty of light to grow, and a windowsill usually won't provide enough for them to thrive. You should consider putting your plant under a grow light of some kind. That way, you can alter the lighting schedule to induce flowering whenever you want and also ensure that your seedling gets enough energy to continue the process of photosynthesis.

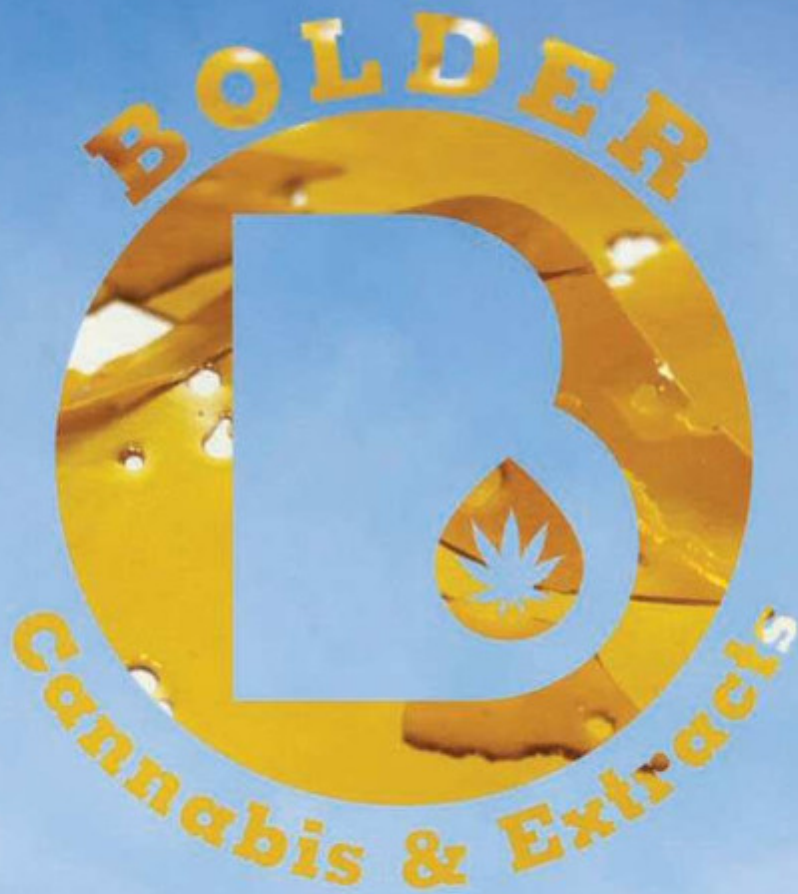
If not, you can leave the plant on the windowsill and it will begin flowering naturally as the fall approaches. Just don't expect to harvest much more than a handful of buds unless you have tons

of light streaming in to help it grow. I seriously doubt there's enough sunlight on a windowsill in the UK for you to harvest much more than several joints' worth of cannabis, so you should consider devoting some space to the plant and getting at least a fluorescent light to provide enough lumens for healthy growth.

SUBJECT: **Power Outage**  
FROM: **Dr. Danko**

🌱 Here in South Africa, we have an issue with power outages. How can I make sure that my plants receive the proper light cycle once the power cuts have happened? I may lose two hours of power (and light) a day, but during the night it's not an issue since it's also the night cycle for my plants. I'm scared the plants will go into shock by going from light to darkness, then back to light and back to darkness all in one day. The outages are usually two hours each time, and we don't really know when they will happen. I can't buy a generator for a 2-by-2-meter grow tent—seems like overkill. What do you suggest?





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*Danko Tip:* Remove yellow leaves from your plants to avoid providing a starter home for pests.

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Dear Dr.,  
Prolonged power outages can be a serious issue when growing marijuana plants, but two hours off here or there during the light cycle isn't a critical problem. It's much more important not to interrupt the dark cycle with light than it is to interrupt the light cycle with darkness. If you don't want to purchase a generator to keep the light going, you can always place the plants outdoors under the sunlight for those couple of hours, assuming the outage is happening during the day.



SUBJECT: **Microgrowing Marijuana**

FROM: **Seth**

I want to do a one-to-three-plant grow only. I was thinking of taking a laundry hamper, connecting a light at the top to a timer, and putting a small tube on either side—one to bring air in and the other to take air out. (I'm not going to bother with air scrubbers.) Now my true question is whether a 250-watt bulb is going to be way too much this setup—i.e., would it burn the plants? You wrote once about using aquarium lights, and I was thinking of using a T8 or T12 lamp, but I want to make sure this will be enough for one to three plants in a small, closed-off space. I remember you recommending them for a 3' x 3' space, and this won't be even that big. I can use any help you can offer, as I've tried growing before and I got long, skinny plants that ended up just bending over and drooping and eventually dying. I probably overwatered them and used too much Epsom salt in the soil. Since then, I've read not to use salts of any kind or Miracle-Gro, which I used as well. So any help and/or thoughts would be most appreciated.

Dear Seth,  
For microgrowers with very limited space, I recommend compact fluorescent lights (CFLs). They won't heat up a small space the way high-intensity discharge (HID) lamps do, and they're also affordable. The T8s or T12s will work too, as long as they fit into your laundry hamper.

Lamps using LEDs (light-emitting diodes) also work well for these purposes, but they require a significant initial investment that most people growing in small spaces are reluctant to make. As the technology advances, however, the prices should drop significantly, so keep your eyes open in the future for good deals on LED grow lights.

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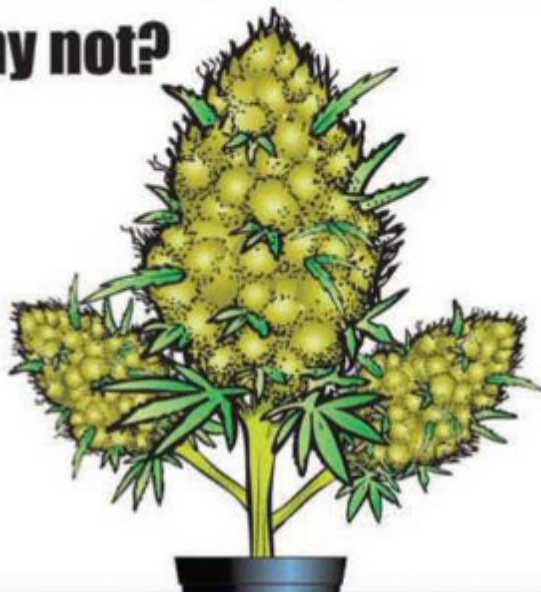


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Since 1994**Serious Seeds****www.seriousseeds.com***Danko Tip: Keep cats and dogs out of your growroom to prevent them from bringing in bugs and covering your plants with fur.*SUBJECT: **Bunched Up**FROM: **Willie**

🌱 I have four seedlings that are into their first week of growth, but they're bunched together in one avocado pot. Are they okay like that? This is my first grow, and I'd like to know when I should transplant them.

Dear Willie,  
Growing marijuana plants close together in a single container isn't ideal, for several reasons. As the plants get bigger, the roots will compete for nutrients, with the larger plants taking advantage of their growth to shade out their smaller competitors. Also, the roots from different plants will quickly start to tangle together, making future transplants difficult and stressful on the plants.

My recommendation is to gently remove the plants from the avocado pot and transplant them into their own individual containers for the remainder of their growth cycle. This way, each plant will have its own space for roots to spread out and won't have to fight for light or nutrients.

SUBJECT: **Heat Stroke**FROM: **Dave A.**

🌱 I'm a medical patient in Michigan growing in an urban upstairs bedroom where heat is always an issue. I'm running two 1,000-watt dimmable HID lights with air-conditioning, and in the summer the temperature at the center of my canopy can reach 85°F. At what temp should I start to dim my lights to 750 or even 600 watts? Keep in mind that at 600 watts, the plants

in the corners of my room (about 36 inches from the center of the light) won't be doing much growing ... will they? I guess I'm asking about the light-versus-heat ratio, and at what point growth starts to suffer. Also, this is only on some very hot days, so should I let them run a little warm for a while to keep up the bright sunshine?

Dear Dave,  
My recommendation is to get yourself an atmospheric controller that will dim your lights automatically when the temperature reaches a certain level. You don't want temperatures higher than 80°F at canopy level, so set your controller to dim at that temp in order to cool your room and allow growth to continue unfazed.

As for the plants in the corners, you can either use a light mover to reach them or, much more affordably, simply move the plants around yourself so that the ones in the corner are in the middle of the room some of the time. That way, you won't see them suffering from a lack of intense light. 🌱



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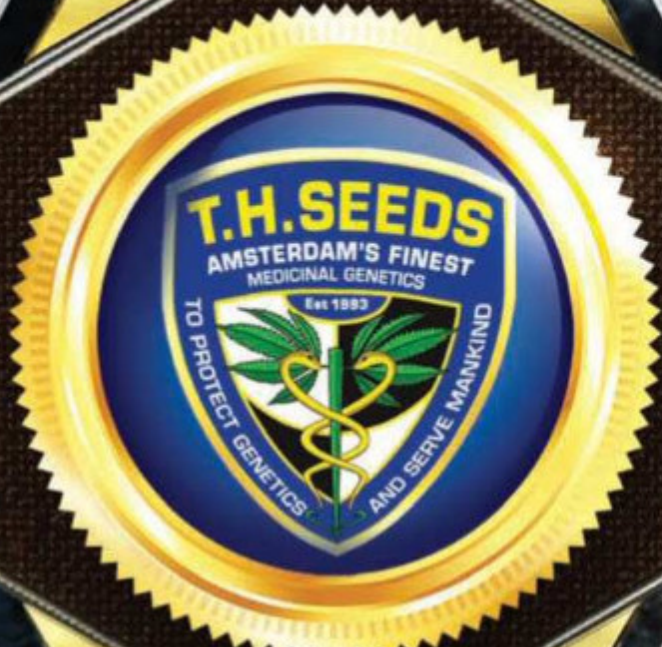
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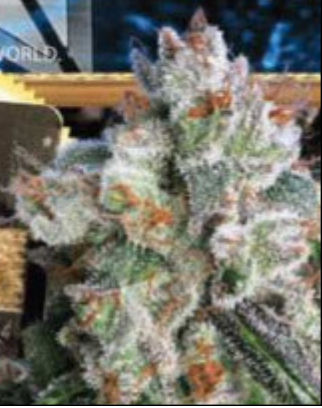


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Meizy poses in the gardens of Fresh Baked in Boulder, CO.

"I was raised in the exotic land of Iowa," Meizy Chiang tells us. Her professional career started in the world of corporate retail management, but what she calls her "proudest accomplishment" was moving to Hawaii on a whim.

"It was the scariest thing I've ever done," she says, "but probably the best thing I could've done for myself. I re-prioritized my life around nonmaterialistic means."

Following a diagnosis of lupus, Meizy moved to Colorado. "I was on steroids and other medications that made me feel like I was deteriorating," she says. "Moving to Colorado was a no-brainer because cannabis is legal and a more natural means of healing. Smoking high-CBD strains and using CBD balms

has changed my life completely. I'm no longer dependent on prescriptions and have minor flare-ups very rarely now."

Presently, she works as a budtender at the Botanico dispensary in Denver, CO and doing a fair share of modeling on the side.

Meizy is frank about the effect cannabis has had on her life. "It's gotten me through a really scary and physically painful time in my life. It's a miracle plant to me."

She says Cherry Pie is her favorite strain and that she's been off her medication for seven months now. "I can't find words that even come close to describing how grateful I am for cannabis and cannabis-related products." 🌿

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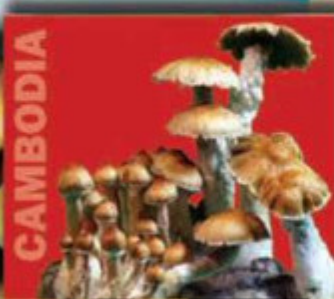
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## Pot Knowledge

Creativity, tunes, strains and drug tests.

Got a question for Dr. Mitch? Email him at [420research@gmail.com](mailto:420research@gmail.com).

Do states with better marijuana laws show more creativity?

*F.O. Fancy*

Hi F.O.,  
New data reveal that after a state passes a medical marijuana law, the number of inventions, patents and works of art increases. Perhaps people are getting high and generating great ideas, but liberal marijuana policies also seem to encourage creative people to move to these states.

One strain that's supposed to cause instant couch-lock ends up amping me up instead. Then there's another one that's supposed to keep me awake, but knocks me out. What gives?

*Ted Wired*

Hi Ted,  
There are two issues at play here: personal differences and quality control. You're a unique individual, just like everybody else, and we all have idiosyncratic differences in our biological functions. Plenty of people find that well-known depressants (such as antihistamines and alcohol) actually stimulate them. Physicians call these "paradoxical reactions." Then too, a strain by any other name might not be the real deal. Prohibition's underground market can't guarantee that today's Sour Kush is the same as yesterday's, or that one sample of Diamond OG is the same as another. So perhaps you didn't really get the strains you thought.



Do you have a favorite cannabis tune?

*Tyrone Songster*

Hi Tyrone,  
Louis Armstrong's instrumental piece "Muggles" came out when the plant was still legal (1928). I can't help but listen and wonder what the world was like back then.

Does drug-testing students have any effect?

*I.P. Freely*

Hi I.P.,  
Yes, it generates profits for the testing companies and infuriates civil-rights activists—but that's about it. New data published in the *Journal of Studies on Alcohol and Drugs* confirm that testing didn't decrease drug use. In contrast, a positive school climate (where students and teachers respect each other and the rules are clear) helped decrease cannabis and cigarette use. Seems like all that drug-test money should be spent on hiring respectful, respectable teachers. 🌿

*Dr. Mitch Earleywine is a professor of psychology at SUNY Albany and the author of Understanding Marijuana and The Parents' Guide to Marijuana.*



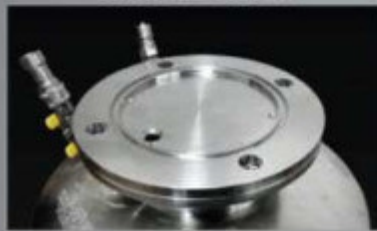


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# Nail Temperatures and Flavor

Finding the right temp for dabbing makes all the difference. *By Craig Coffey*

**I**f you ever want to make a room full of wooks gasp, here's all you have to do: Prepare a dab and blast the shit out of the nail until it's glowing whitish-red, then sizzle through that dab on the 1,200°F surface. Every flat-billed baseball cap in the room will flip, followed by a chorus of "Bro!" Someone will definitely want to address your high-temp dabbing problem.

There's more going on here than slab snobbery, however. The low-temp dabbing creed has some merit: The different compounds that make up a concentrate have a range of temperatures at which they'll vaporize (i.e., volatilize), as shown here:

*THC:* 314°F (157°C)

*CBD:* 347°F (175°C)

*Beta-myrcene:* 330°F (166°C)

*D-limonene:* 350°F (177°C)

*Linalool:* 388°F (198°C)

None of the things that a person wants to inhale require temps higher than 400°F to vaporize. Keeping the nail in the 350°F to 400°F range will deliver only the desired compounds from your dabs. Ideally, you want to leave a bit of residue behind—about three percent of the total dab. This portion is where the compounds that require higher temperatures for vaporizing collect. Higher-temp

dabs can taste like reclaim, because when you hit a very hot nail, it never gets a chance to become reclaim—it goes right into your hit.

A great flavor hit is a slow process. Heat the nail a little past the target temp, then set the rig down and wait a few seconds. When the rig is ready, apply the dab to the heated surface and inhale slowly as it boils away.

Use a carb cap to cover the bowl and allow some convective heat to help finish off the hit. The residue left behind is burned off when you prepare your next dab.

In the lower-temperature range (300°F to 400°F), the oils in a dab will boil (i.e., volatilize). In this phase, the molecules are essentially unchanged and transformed into a vapor state. At some point beyond this temperature (>450°F), these same compounds will burn, or oxidize. At the point of oxidization, the molecules are changed through a process of heat-induced chemical reactions. The next level of heat (>800°F) can cause oxidized compounds to combine and form new compounds; this is called *polymerization*. A red-hot Ti nail is roughly 1,200°F to 1,500°F, which means you're not really *dabbing* on a red-hot nail—you're inhaling exotic polymerized compounds created from cannabinoids. ✨



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## High Ratings

CNN capitalizes on 4/20 with copious cannabis coverage.

**I**t appears that CNN, “The Most Trusted Name in News,” may have gotten a contact high. On April 19—a.k.a. 4/20 Eve—the network premiered two new specials about cannabis: Sanjay Gupta’s *Weed 3: The Marijuana Revolution* and *High Profits*, a miniseries about a pot shop in Breckenridge, Colorado. Naturally, both shows ended up snagging the #1 slot in cable-news viewership that night. And though I was too busy onstage at our US Cannabis Cup awards in Denver to watch them, I was able to attend two exclusive events back in New York a few weeks earlier that offered me a sneak preview of each.

The first was a speaking engagement at the 92nd Street Y entitled “Mind, Medicine and Media,” featuring Dr. Gupta and one of his *Weed 3* interviewees, psychopharmacologist Dr. Julie Holland. If her name doesn’t sound familiar, it should: Dr. Holland is the author of several books, including *Ecstasy: The Complete Guide* and *The Pot Book: A Complete Guide to Cannabis*. She was also featured in the documentary *Botany of Desire* (based on Michael Pollan’s book of the same name) and is an adviser to two studies exploring the efficacy of cannabis and MDMA in treating post-traumatic stress disorder. So it came as no surprise that the benefits of medical marijuana—particularly in relation to PTSD—were the prevalent topic of discussion that evening.

They touched on its multitude of medicinal applications—not just for severe conditions, but also in daily use as a preventative to reduce stress and inflammation (both of which Dr. Holland believes play a huge role in many chronic ailments). They also lamented the continued obstruction of cannabis research in the U.S. and the disastrous effects of overprescribed

and mis-prescribed pharmaceuticals—specifically, antipsychotics, antidepressants and opioid pain meds—not just on our veterans, but on the population at large. Overall, it was an informative and sobering discussion—thankfully tempered with the pair’s characteristic humor, charm and hope.



Gupta for ganja!

The second event was an advance screening of the *High Profits* pilot at Tribeca Cinemas. Unlike most of the cannabis business reality shows of the past few years (i.e. MSNBC’s *Pot Barons of Colorado*), I was glad to see that this show focused not on venture-capital opportunists getting into the ganja game for a fast buck, but an average stoner couple following their dreams. I was also happy to see our editor-in-chief, Dan Skye—who was in Colorado covering the state’s first legal pot sales when the show was taped—featured prominently (and favorably) in the show.

After the screening, attendees were invited to the adjoining Varick Room, where we were treated to an open bar and free food that included a stoner-snack station. In between my martinis and munchies, I got to meet the show’s stars: Brian Rogers and Caitlin McGuire, owners of the Breckenridge Cannabis Club. We talked about the ever-evolving legalization landscape and the major media’s take on it all. The couple were also in Denver the following week to host another screening at our US Cup—this one mere hours before its CNN debut.

As marijuana continues its merry march into the mainstream, we’ll be seeing more and more pot-positive programming on TV. (In fact, NBC is rumored to be developing a sitcom about a pair of budtenders in Denver called *Buds*.) Make no mistake, my friends—the revolution shall indeed be televised—and the ratings will be as high as we are. ✨

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# Higher Education

Looking for a curriculum that trains you for work in the cannabis industry? You don't have to look far!

*Allen St. Pierre is executive director of NORML. Visit [norml.org](http://norml.org).*

**T**hese days at NORML, as US pot prohibition enters its long, slow fade, the organization receives as many inquiries regarding employment in the cannabis industry as it does from people seeking help because they've been arrested for pot.

So how exactly do you receive a canna-centric education in order to find a job as a budtender, compliance manager or master cultivator? Easy! Go to school and earn accreditation via a certificate or diploma. You can attend cannabis trade schools, take courses at major universities, concentrate in a community-college setting, or engage in online coursework.

The first and most successful of the cannabis trade schools is Oaksterdam University, founded in Oakland, CA, in 2007 by activist and ganjapreneur Richard Lee. Another option is the Cannabis Career Institute, which convenes well-run conferences nationwide for aspiring investors, managers and workers in cannabis-related businesses. Online education is available through companies like the Cannabis Training Institute, Clover Leaf University and the Cannabis Hemp Academy.

Students who want to focus on canna-business law or legal and regulatory compliance practices can now study these subjects at major universities like Vanderbilt, the University of Denver and Ohio State. At the Santa Clara University



By NORML's estimates there are nearly 4,000 cannabusinesses currently operating in the United States and more than 15,000 registered employees in Colorado alone.

School of Law, students are poised to join this new industry through the guidance of their professor, W. David Ball, who chairs the Public Safety Working Group of the Blue-Ribbon Commission on Marijuana Law and Policy, which has been convened by California's lieutenant governor, Gavin Newsom.

Ball notes that his students could help shape the future of legal marijuana in California. "It's exciting," said SCU law student Bethany Brass, speaking to San Jose's KNTV back in February. "Your work is going to have an effect on the legal policy and legislation that's going to be proposed in 2016."

Thirty years ago, American schools engaged in rankly inane—and ultimately ineffective—anti-pot propaganda. But the "Just Say No" campaign withered and died, while DARE and the Partnership for a Drug-Free America have lost all credibility.

Meanwhile, by NORML's estimates, there are nearly 4,000 cannabusinesses currently operating in the United States and more than 15,000 registered employees in Colorado alone. As a result, canna-centric education and training schools are fulfilling a market need for trained, certified professionals in what is clearly a booming industry.

Oh, how the weed worm continues to turn! 🌿

## FREEDOM FIGHTER

*By Kevin Mahmalji, NORML national outreach coordinator*

### The Big Push

Kevin Cranford's energy and passion moves Maryland forward.

Born and raised in Connecticut, Kevin Cranford moved to Baltimore to attend Morgan State University. While completing his master's degree, he began working as a volunteer with Maryland NORML.

Now the group's deputy director,

Kevin has provided testimony to the Maryland General Assembly, organized countless letter-writing campaigns, and helped Maryland NORML expand its membership throughout the state.

Most recently, with the help of NORML's national office and the East Coast Cannabis Coalition, Kevin organized the #GoGreen2015



social-media campaign.

Launched on April 20, it encouraged NORML chapters across the country to change their profiles and background pictures on social-media sites to the color green to present a united front in the cause of ending cannabis prohibition.

Kevin believes that we have to move toward a common-sense drug policy and away from the folly of the

last 40 years. He maintains that legalization will create new revenue to fund education and repair our crumbling infrastructure. He's also passionate about America's prison crisis, which the Drug War helped spawn.

"As we wind down the War on Drugs," he says, "we need to rebuild the communities this 40-year conflict has helped to destroy, and to bring the outcasts—those who have been imprisoned—back into society."

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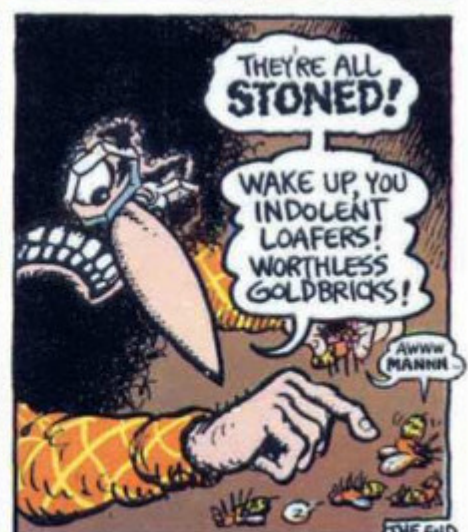
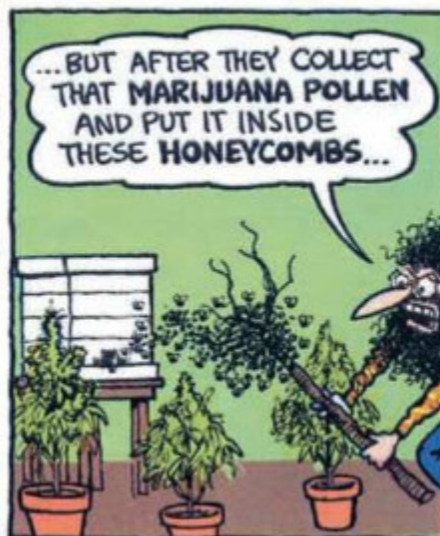
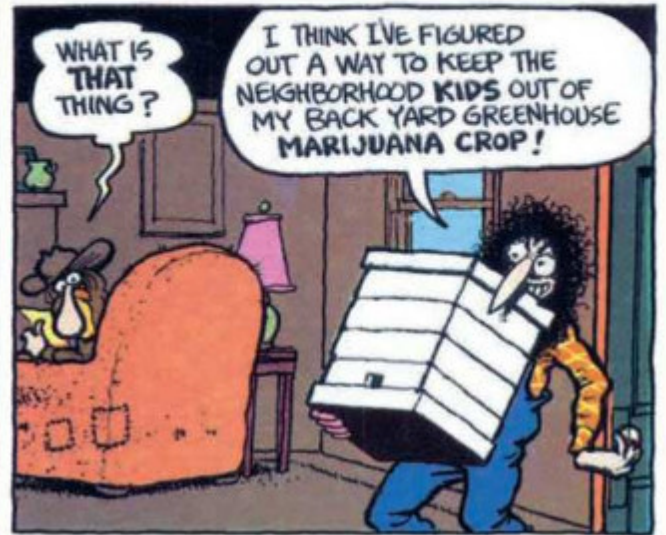
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**CLOSE UP OF THE MONTH**

**EMERALD GREEN**


 Greetings from beautiful Northern California!

Photo Credit to Drea-M @ Humboldt High Country Photography






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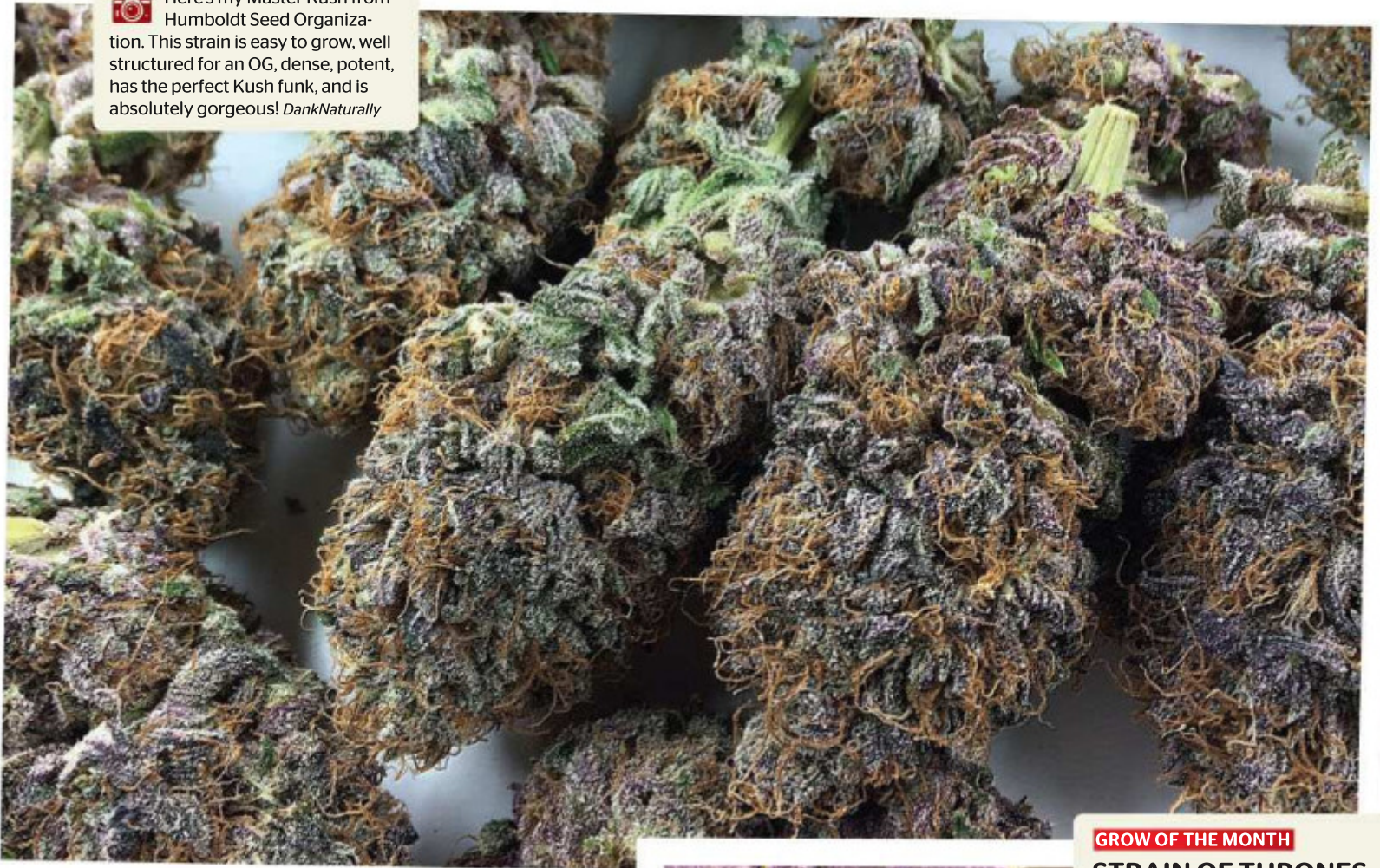
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**NUGS OF THE MONTH**

**MASTER PIECE**

Here's my Master Kush from Humboldt Seed Organization. This strain is easy to grow, well structured for an OG, dense, potent, has the perfect Kush funk, and is absolutely gorgeous! *DankNaturally*



**GROW OF THE MONTH**

**STRAIN OF THRONES**

Hello! Here's a little love from my bedroom. All organic soil and organic hydro. LED and HPS. The strains are Dutch Treat, Satori, Trapper Creek OG, Blue Mystic, Snow Cap, Durban Poison and Timewreck #3. *Flying Dutchman, Jr.*



**COLA OF THE MONTH**

**CAPO DI TUTTI CAPI**

High there, just sharing some of my Capo Kush! I work as a budtender/social media director of a dispensary in Lakewood, Colorado called Kind Pain Management as well as provide Cannabis Photography! Enjoy your day! *Jena, @fillyoueyes*



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# October 2015

# HIGH TIMES



The booming cannabis industry requires many hands.

## ► The Business of Buds 2015

Looking to break into the cannabis industry, but don't know where to start? Business journalist Emma Johnson examines which pot jobs are in high demand these days, and which sectors of this fertile industry are primed to see the most explosive growth.

## ► Motor City Marijuana

When activist John Sinclair was sentenced to 10 years in prison back in 1969 for giving two joints to an undercover cop, it spurred a legalization movement in southern Michigan that continues to thrive to this day. But here's the \$420 question: Could legal pot restore Detroit to its former glory?

## ► The Ultimate Cannabutter Experiment

Which method of making cannabutter properly activates the most THC, while ensuring that none of your weed goes to waste? Elise McDonough, author of *The Official High Times Cannabis Cookbook*, examines the four leading ways to infuse your butter with THC.

## ► Killing Pests & Curing Diseases

In this excerpt from his latest book, *The Cannabis Encyclopedia*, renowned marijuana expert Jorge Cervantes discusses the various parasites, predators and ailments that can impact your pot crop and guides you down the road to healthy, pest-free plants.

## ► Mel Frank & the Dank

In the early 1970s, *The Marijuana Grower's Guide* was published—a book that literally spawned the American cultivation scene. Co-author Mel Frank tells the tale of how marijuana cultivation morphed from hobbyists with fluorescent lights into the megawatt warehouses of today.

## ► Nugs of the Northwest

Located in Washington State's Columbia River Basin, the BUDS farm in Pasco produces top-grade ganja using a remarkable ebb-and-flow hydro system. Editor-in-chief Dan Skye drops in to investigate.

DAN SKYE



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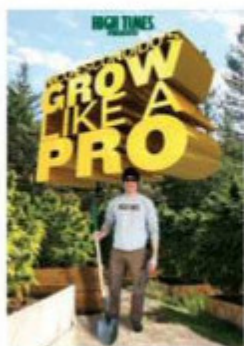
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## Featured Products



**HIGH TIMES Cultivation Editors' Combo Pack**  
Set includes Jorge Cervantes' *Ultimate Grow Box Set*, Nico Escondido's *Grow Like a Pro*, and Danny Danko's *Field Guide to Marijuana Strains*. An \$85 value for only **\$69.99!**



**HIGH TIMES Presents Nico Escondido's *Grow Like a Pro* DVD**  
Featuring over two hours of comprehensive cultivation coverage and bonus material, this HD-film features footage of America's top medical grow facilities, indoor and outdoor-growing and greenhouse techniques. **\$19.95**



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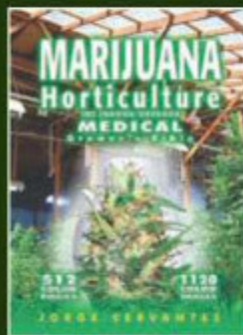


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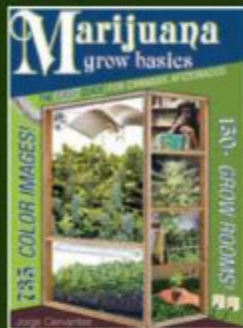
## Classics from master grower Jorge Cervantes



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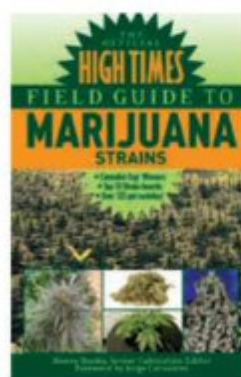


**Marijuana Horticulture**  
The Fifth Edition of Jorge Cervantes' best-selling book, completely rewritten, updated and expanded! **\$29.95**

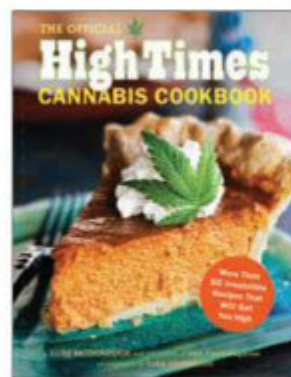


**Marijuana Grow Basics**  
This informative guide is packed with illustrations and photos of more than 150 affordable marijuana grow setups. **\$21.95**

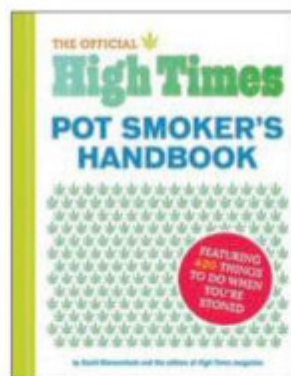
## High Times Books



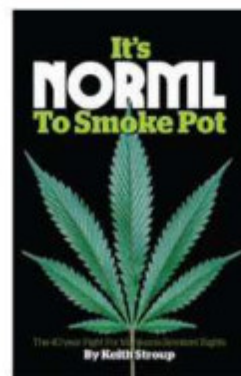
**The Official HIGH TIMES Field Guide to Marijuana Strains**  
By Danny Danko  
This cannabis compendium covers the world's top pot varieties—all meticulously researched and lovingly described in terms ranging from odors and flavors to potency levels and medicinal properties. **\$14.95**



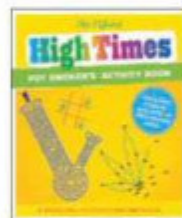
**The Official HIGH TIMES Cannabis Cookbook**  
by Elise McDonough  
Go way beyond the brownie and master your munchies with over 50 recipes for stoner cuisine that will get you high—including recipes inspired by Cheech and Chong, Snoop Dogg and Willie Nelson. **\$19.95**



**The Official HIGH TIMES Pot Smoker's Handbook**  
by David Bienenstock  
This handbook rolls up all of our collected wisdom into one indispensable ganja guide. With a life-changing list of 420 things to do when you're stoned, this is truly the ultimate guide to green living. **\$19.95**



**It's NORML To Smoke Pot: The 40-Year Fight For Marijuana Smokers' Rights**  
By Keith Stroup  
The story of NORML, the oldest and most effective organization dedicated to the reform of marijuana laws, told by its founder and leader. If you believe in the principle of civil liberties, then Keith Stroup is a true American hero. **\$14.99**



**The Official HIGH TIMES Pot Smoker's Activity Book**  
by Natasha Lewin  
Smoke, play, laugh and learn all at the same time! Packed with puzzles, games, mazes, and jokes. It's what to do when you're stoned! **\$16.95**



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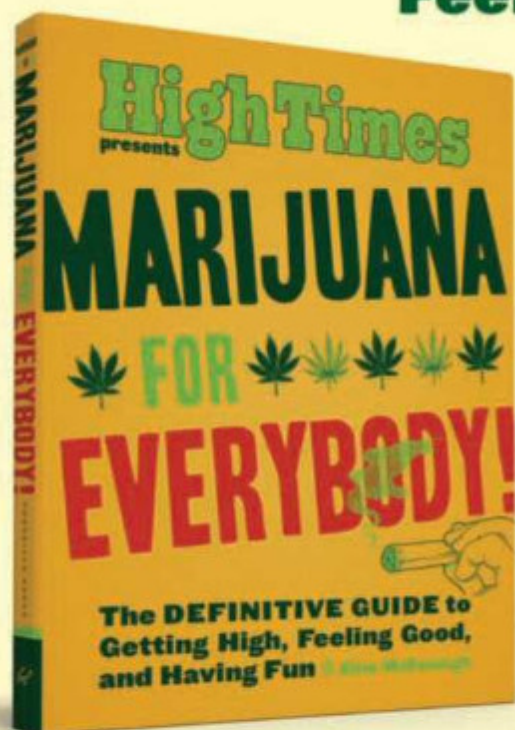
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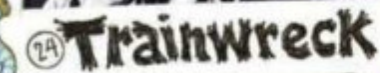
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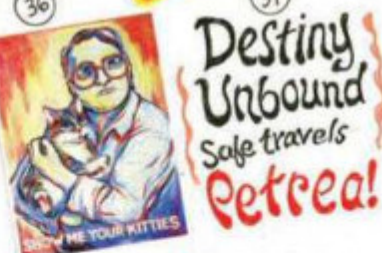
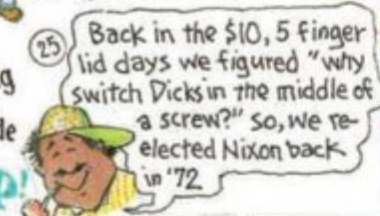
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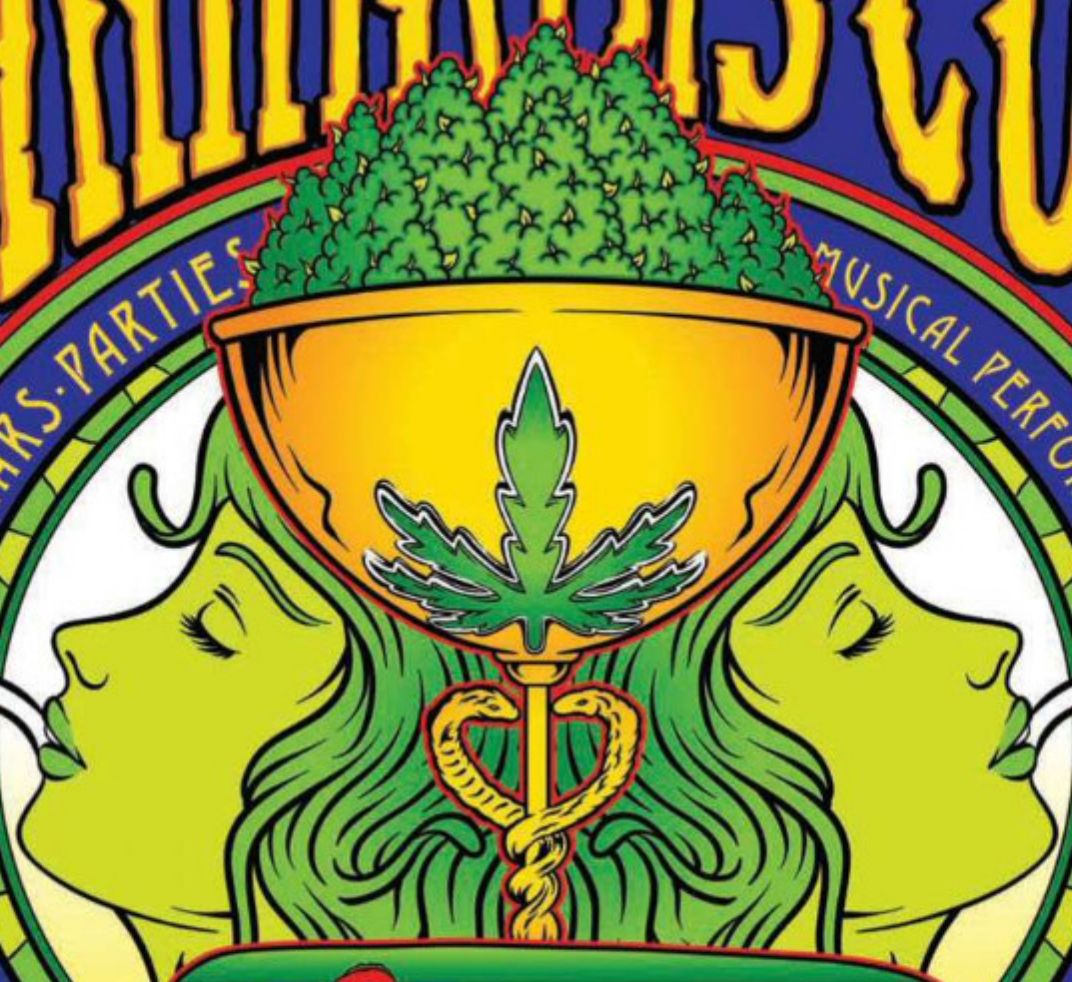
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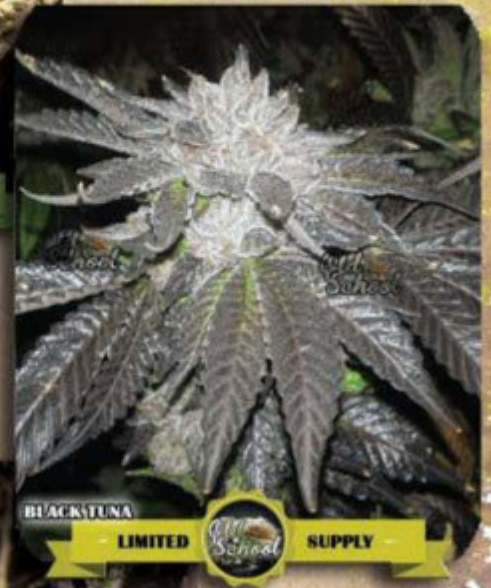
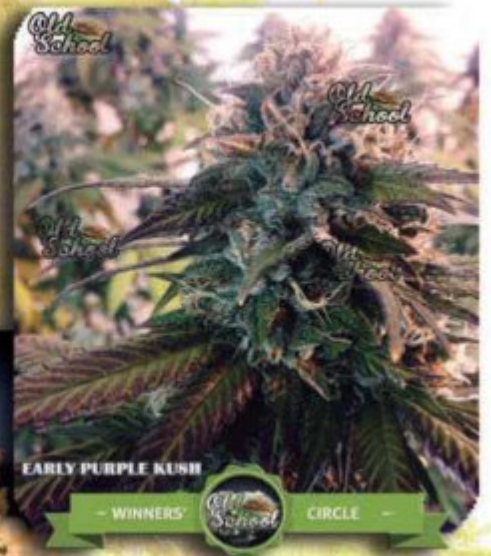
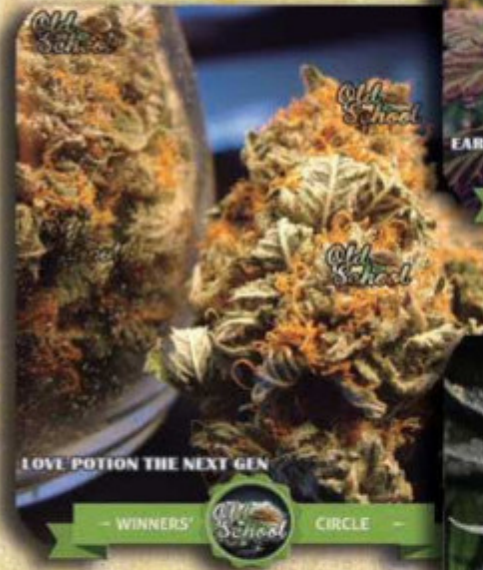
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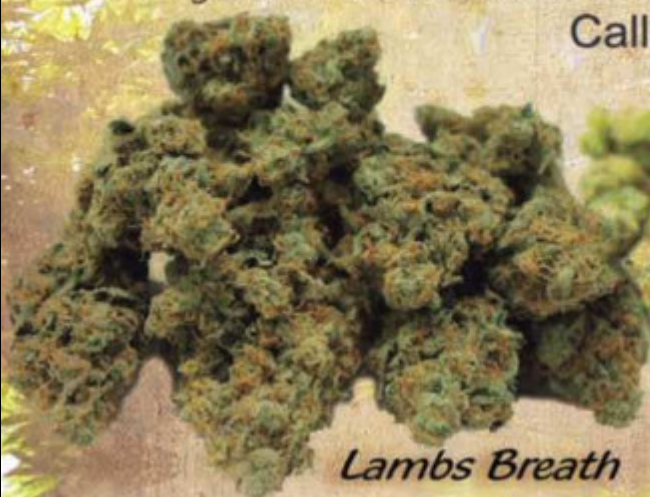
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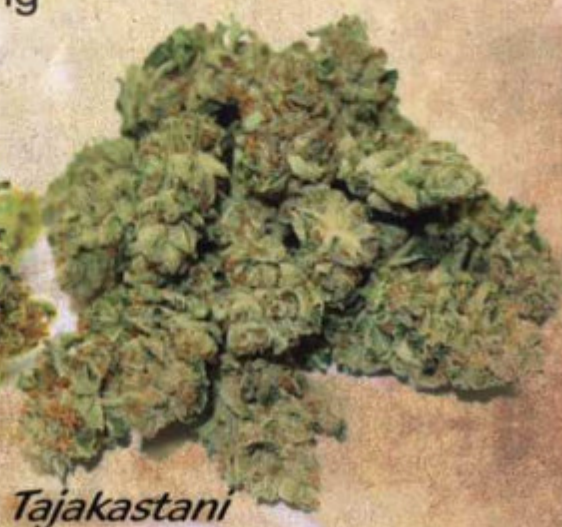
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